FOR·THE·INCREASE·AND·DIFFVSION·OF·KNOWLEDGE·AMONG·MEN
PER ORBEM
SMITHSONIAN·INSTITVTION·
WASHINGTON·1846·

SHOUT
SHARE
IT

United States National Museum
Bulletin 209

Nearctic Wasps of the Subfamilies Pepsinae and Ceropalinae

By HENRY TOWNES

SMITHSONIAN INSTITUTION • WASHINGTON, D. C. • 1957

Nearctic Wasps of the Subfamilies Pepsinae and Ceropalinae

Introduction

The family Psammocharidae includes a large number of common wasps that provision their nests with spiders. Typical psammocharids are long-legged insects commonly seen on flowers or running rapidly over the ground or low vegetation, often nervously flipping their wings. A large portion of the Nearctic species are black with black wings, though various members of the family are marked or colored with red, orange, yellow, white, or metallic blue. Technically, the psammocharids may be distinguished from all other wasps by a straight transverse groove that divides the mesopleuron into upper and lower halves (figure 1,*b*). This groove is always present, and though other wasps possess grooves on the mesopleuron, none but the psammocharids have one that is single, straight, and transverse. The species included in the present paper are those belonging to the subfamilies Pepsinae and Ceropalinae, occurring in America north of México.

Previous taxonomic work on these species, except for two papers on *Pepsis* by Hurd, is not outstanding and consists largely of the description of new species. References to all the original descriptions are given in the species headings, the significant papers dealing with biology are cited in the synonymy of the species concerned, and the few revisional papers may be located by referring to a recent catalogue (Townes and Hurd, 1951, U. S. Dep. Agr., Agr. Monogr. No. 2, pp. 907–973). In addition to this literature are numerous locality records (largely in state lists), some notes on synonymy and taxonomy, and the well known lectotype lists by Cresson (types in the Academy of Natural Sciences of Philadelphia) and by Rohwer and Gahan (Provancher types). The specimens which form the bases for most of this literature have been restudied and re-recorded according to the taxonomy in this paper. No attempt has been made to correct the many errors of identification that occur in literature, but if a record in literature is not repeated in the summary of the distributional and biological data from pin labels on the specimens studied,

Publications of the U. S. National Museum

The scientific publications of the National Museum include two series known, respectively, as *Proceedings* and *Bulletin.*

The *Proceedings* series, begun in 1878, is intended primarily as a medium for the publication of original papers based on the collections of the National Museum, that set forth newly acquired facts in biology, anthropology, and geology, with descriptions of new forms and revisions of limited groups. Copies of each paper, in pamphlet form, are distributed as published to libraries and scientific organizations and to specialists and others interested in the different subjects. The dates at which these separate papers are published are recorded in the table of contents of each of the volumes.

The series of *Bulletins*, the first of which was issued in 1875, contains separate publications comprising monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal works, reports of expeditions, catalogs of type specimens, special collections, and other material of similar nature. The majority of the volumes are octavo in size, but a quarto size has been adopted in a few instances. In the *Bulletin* series appear volumes under the heading *Contributions from the United States National Herbarium*, in octavo form, published by the National Museum since 1902, which contain papers relating to the botanical collections of the Museum.

The present work forms No. 209 of the *Bulletin* series.

REMINGTON KELLOGG,
Director, United States National Museum.

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1957

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price $1.50 (paper cover)

Contents

Page

Introduction 1
Subfamily Pepsinae 8
  Tribe Pepsini 9
    Genus *Chirodamus* Haliday 11
    Genus *Pepsis* Fabricius 25
    Genus *Hemipepsis* Dahlbom 32
    Genus *Priocnessus* Banks 40
    Genus *Priocnemioides* Radoszkowski 49
    Genus *Cryptocheilus* Panzer 67
    Genus *Priocnemis* Schiødte. 80
      Subgenus *Sphictostethus* Kohl. 81
      Subgenus *Clistoderes* Banks 83
      Subgenus *Priocnemissus* Haupt 83
      Subgenus *Priocnemis* Schiødte 89
    Genus *Calicurgus* Lepeletier 108
    Genus *Dipogon* Fox 115
      Subgenus *Deuteragenia* Sustera 116
      Subgenus *Dipogon* Fox 131
  Tribe Macromerini 140
    Genus *Phanagenia* Banks 141
    Genus *Auplopus* Spinola 143
    Genus *Ageniella* Banks 167
      Subgenus *Leucophrus* Townes 168
      Subgenus *Nemagenia* Banks 174
      Subgenus *Priophanes* Banks 176
      Subgenus *Ageniella* Banks 189
      Subgenus *Ameragenia* Banks 215
    Genus *Priocnemella* Banks 219
Subfamily Ceropalinae 220
  Tribe Notocyphini 221
    Genus *Notocyphus* Smith 222
  Tribe Minageniini 225
    Genus *Minagenia* Banks 226
  Tribe Ceropalini 237
    Genus *Ceropales* Latreille 238
Index 273

Nearctic Wasps
# of the
Subfamilies Pepsinae and Ceropalinae

Introduction

The family Psammocharidae includes a large number of common wasps that provision their nests with spiders. Typical psammocharids are long-legged insects commonly seen on flowers or running rapidly over the ground or low vegetation, often nervously flipping their wings. A large portion of the Nearctic species are black with black wings, though various members of the family are marked or colored with red, orange, yellow, white, or metallic blue. Technically, the psammocharids may be distinguished from all other wasps by a straight transverse groove that divides the mesopleuron into upper and lower halves (figure 1,*b*). This groove is always present, and though other wasps possess grooves on the mesopleuron, none but the psammocharids have one that is single, straight, and transverse. The species included in the present paper are those belonging to the subfamilies Pepsinae and Ceropalinae, occurring in America north of México.

Previous taxonomic work on these species, except for two papers on *Pepsis* by Hurd, is not outstanding and consists largely of the description of new species. References to all the original descriptions are given in the species headings, the significant papers dealing with biology are cited in the synonymy of the species concerned, and the few revisional papers may be located by referring to a recent catalogue (Townes and Hurd, 1951, U. S. Dep. Agr., Agr. Monogr. No. 2, pp. 907–973). In addition to this literature are numerous locality records (largely in state lists), some notes on synonymy and taxonomy, and the well known lectotype lists by Cresson (types in the Academy of Natural Sciences of Philadelphia) and by Rohwer and Gahan (Provancher types). The specimens which form the bases for most of this literature have been restudied and re-recorded according to the taxonomy in this paper. No attempt has been made to correct the many errors of identification that occur in literature, but if a record in literature is not repeated in the summary of the distributional and biological data from pin labels on the specimens studied, it may be regarded as incorrect or unverified as far as my own researches are concerned.

Between August 1952 and February 1954, while this paper was awaiting publication, K. V. Krombein has published five papers containing brief but interesting habitat notes on a number of pepsines. Most of his specimens have been studied and included in my distributional data, but his habitat notes are more exact and detailed than I have listed them. They can be consulted on the following pages: 1952, Trans. Amer. Ent. Soc., vol. 78, pp. 91–92; 1952, Proc. Ent. Soc. Washington, vol. 54, pp. 176–177; 1953, Proc. Ent. Soc. Washington, vol. 55, p. 130; 1954, Bull. Brooklyn Ent. Soc., vol. 49, pp. 3–4; and 1954, Proc. Ent. Soc. Washington, vol. 56, p. 230.

This paper completes a taxonomic revision of the Nearctic Psammocharidae, other sections of the family having been treated as follows: Aporini by Bradley, 1944, Trans. Amer. Ent. Soc., vol. 70, pp. 23–157. Psammocharini by Evans, 1950 and 1951, Trans. Amer. Ent. Soc., vol. 75, pp. 133–270; vol. 76, pp. 207–361; and vol. 77, pp. 203–340. *Pepsis* by Hurd, 1952, Bull. Amer. Mus. Nat. Hist. vol. 98, pp. 261–334.

The family name

Pompilidae, rather than Psammocharidae is a name sometimes used for this family, but it may not be so used correctly. The generic name *Pompilus* Fabricius 1898, type of the family name Pompilidae, has *Pompilus viaticus* Fabricius as its genotype. *Pompilus viaticus* is a species of Sphecidae, because of which the generic name *Pompilus* may be used correctly only in the Sphecidae. In regard to the name Psammocharidae, its type genus is *Psammochares* Latreille, 1896, with the genotype *Sphex fusca* Linnaeus. *Fusca* is a species of the subfamily Psammocharinae in the present family. The generic name *Psammochares* is the oldest name in the family and as such may be used as the type of the family name. Pate (1946, Trans. Amer. Ent. Soc., vol. 72, pp. 123–128) has discussed this nomenclatorial situation in detail.

Older authors have used the name Pompilidae for the family without considering its validity, but in 1910 Banks introduced usage of the correct name, Psammocharidae, which steadily gained favor until by a generation later the majority of the basic literature of the world used this name. Certain workers who wished to continue using the name Pompilidae, however, appealed to the International Commission on Zoological Nomenclature for an arbitrary declaration that Psammocharidae was incorrect and Pompilidae was correct. The International Commission obliged by issuing in 1945 its Opinion No. 166, throwing its influence behind the usage of the name Pompilidae and against the name Psammocharidae. This is one of a series of similar actions by the International Commission whose purpose has been to promote uniformity in zoological nomenclature and to gain additional support for itself by appeasing those zoologists wishing arbitrarily to maintain certain names in which their convenience and prestige were involved, rather than to submit the disposition of the names to impartial rules of procedure. Although a purpose of the International Commission was to decrease confusion, it has so often been misinformed on the specific cases and on certain general nomenclatorial situations that confusion has instead been multiplied. It is hard to see how the influence of these kinds of actions can endure indefinitely, and since their influence is considered temporary they are disregarded and the name Psammocharidae is here retained.

In the preparation of this paper the necessary decisions, both zoological and nomenclatorial, have been dependent on the painstaking collection and consideration of the pertinent data so far as they could be unearthed and comprehended. This has meant many hours of work and many revisions of previous ideas. Most of the revisions have been inconvenient to make, and some which pointed up former errors have been embarrassing to admit. But, if it were found that in some cases pertinent facts had been purposely hidden or arbitrarily dismissed from consideration, users of the paper would conclude that it lacked trustworthiness. The human researcher never entirely escapes the influences of laziness and prejudice, but having striven at much cost for accurate and honest work in the body of the paper, it would be inconsistent to knowingly abandon this course by adopting the family name Pompilidae. Such considerations, however, do not have an equal appeal to all workers, and many are now using the name Pompilidae on the authority of the International Commission on Zoological Nomenclature.

Material studied and acknowledgments

The specimens in the North American collections listed below have been studied:

U. S. National Museum, Washington, District of Columbia.
H. E. Evans, Ithaca, New York.
Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts.
University of California, Berkeley, California.
Henry and Marjorie Townes, Raleigh, North Carolina.
K. V. Krombein, Arlington, Virginia.
California Academy of Sciences, San Francisco, California.
Texas Agricultural and Mechanical College, College Station, Texas.
Cornell University, Ithaca, New York.
Canadian National Collection, Ottawa, Ontario.
University of Kansas, Lawrence, Kansas.
David Shappirio, Washington, District of Columbia.
University of Minnesota, St. Paul, Minnesota.

North Carolina Department of Agriculture, Raleigh, North Carolina.
Kansas State College, Manhattan, Kansas.
Morton Vogel, Washington, District of Columbia.
University of Michigan, Ann Arbor, Michigan.
North Carolina State College, Raleigh, North Carolina.
University of Ohio, Columbus, Ohio.

In the statement of the location of a specimen or a type, the city of an institutional collection or the owner's name in the case of a personal collection is used as the reference word. In Raleigh, North Carolina, there are two institutional collections, that of the Department of Agriculture and that of North Carolina State College. The former is indicated by "Raleigh" and the latter by "State College, Raleigh."

The many institutional and personal collections made available for study have permitted correlation of the work of many collectors—a tedious job; however, it has been of great value in giving a more complete idea of the specific distribution and variation, the opportunity, at times, to correct initial misinterpretations with the study of more material, and a more nearly complete record of the fauna than would otherwise have been possible. I was particularly fortunate in having the cooperation of Doctors H. E. Evans and P. D. Hurd, who collected and sent a great many interesting specimens for study. Dr. Evans also sent his flower records, notes on the species of spiders captured as prey, and other biological notes. Much of the material at the U. S. National Museum, on which this study was initiated, was collected by Mr. J. C. Bridwell. Mr. George Townes paid especial collecting attention to these wasps and sent me many important specimens, mostly from Columbia, S. C. Mr. R. R. Dreisbach assisted by sending manuscript copies of his papers and by lending manuscript types for study. Opportunity to see some of his extensive work on the genitalia of psammocharids, mostly still unpublished, saved much time that would otherwise necessarily have been spent in exploratory work on these structures. It might be added that the brief treatment of them in the present paper does not reflect their total taxonomic value, but rather that other structures are usually sufficient for an accurate determination, and that Mr. Dreisbach is about to publish photomicrographs of the genitalia of nearly all the Nearctic species. Spider prey collected with certain of the specimens were determined by Doctors H. H. Swift and B. J. Kaston. Mr. K. V. Krombein has reviewed the manuscript with the eye of an editor as well as of a hymenopterist, and has sent many interesting notes and specimens for incorporation.

All the types in North American collections except the Provancher types and those of *Pepsis* have been studied. Comparisons with and notes on the types of Dahlbom at Lund, Sweden, were made for me

EXPLANATION OF PLATES

Plate 1

Figure 1, *Chirodamus pyrrhomelas* ♀; 2, *Pepsis thisbe* ♀; 3, *Hemipepsis ustulata ochroptera* ♀; 4, *Priocnessus nebulosus* ♀; 5, *Priocnemioides austrinus austrinus* ♀; 6, *Cryptocheilus idoneum birkmanni* ♀; 7, *Priocnemis* (*Priocnemissus*) *minorata* ♀; 8, *Calicurgus hyalinatus alienatus* ♀; 9, *Dipogon* (*Deuteragenia*) *sayi sayi* ♀; 10, *Dipogon* (*Dipogon*) *brevis brevis* ♀; 11, *Auplopus nigrellus* ♀; 12, *Notocyphus dorsalis arizonicus* ♂; 13, *Minagenia clypeata* ♀; 14, *Ceropales maculata fraterna* ♀.

Plate 2

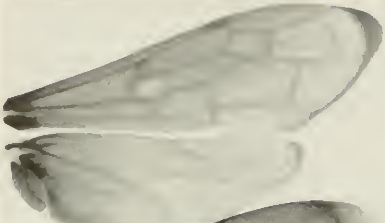
Figure 15, *Chirodamus maculipennis* ♀; 16, *Priocnessus apache* ♀; 17, *Priocnemioides angusticeps* ♀; 18, *Priocnemioides unifasciatus unifasciatus* ♀; 19, *Priocnemioides unifasciatus californicus* ♀; 20, *Cryptocheilus terminatum terminatum* ♀; 21, *Priocnemis* (*Sphictostethus*) *pretiosa* ♀; 22, *Priocnemis* (*Priocnemis*) *germana* ♀; 23, *Priocnemis* (*Priocnemis*) *scitula scitula* ♀; 24, *Priocnemis* (*Priocnemis*) *hestia* ♀; 25, *Priocnemis* (*Priocnemis*) *minuscula* ♀; 26, *Dipogon* (*Deuteragenia*) *pulchripennis* ♀; 27, *Dipogon* (*Deuteragenia*) *papago anomalus* ♀; 28, *Dipogon* (*Deuteragenia*) *sayi nigrior* ♀ (type); 29, *Dipogon* (*Dipogon*) *graenicheri atratus* ♀ (type); 30, *Auplopus architectus architectus* ♀; 31, *Ageniella* (*Priophanes*) *faceta faceta* ♀; 32, *Ageniella* (*Ageniella*) *conflicta* ♀; 33, *Ageniella* (*Ageniella*) *accepta* ♀; 34, *Ageniella* (*Ageniella*) *blaisdelli* ♀.

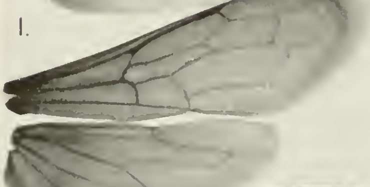
Plate 3

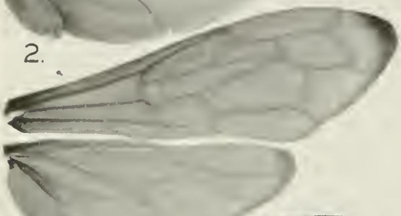
Figure 35, *M. congrua;* 36, *M. lata* (type); 37, *M. clypeata;* 38, *M. osoria;* 39, *M. montisdorsa*, variety with long squama; 40, *M. montisdorsa*, variety with short squama.

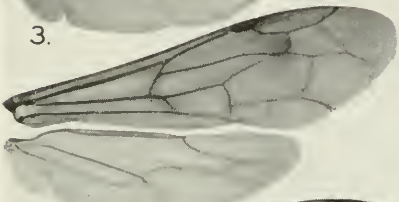
Plate 4

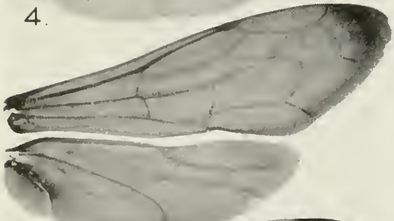
Figure 41, *M. julia*, variety with long squama; 42, *M. julia*, variety with long squama; 43, *M. julia*, variety with short squama; 44, *M. lata*, subgenital plate of type; 45, *M. osoria*, subgenital plate; 46, *M. congrua*, subgenital plate; 47, *M. julia*, subgenital plate; 48, *M. montisdorsa*, subgenital plate.

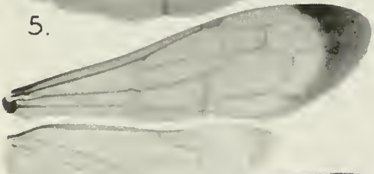

1.

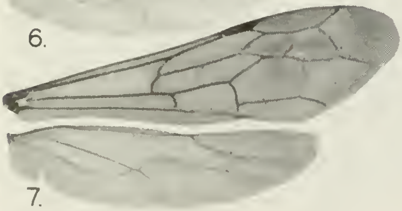

2.

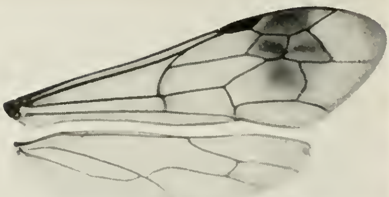

3.

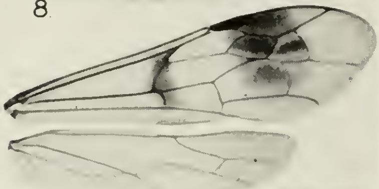

4.

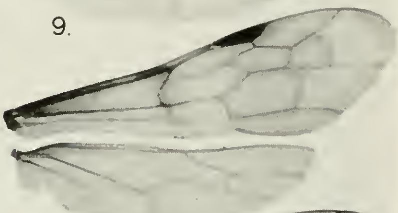

5.

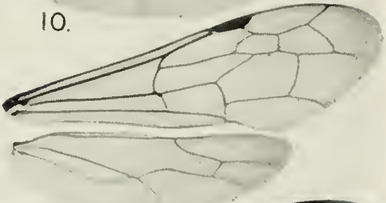

6.

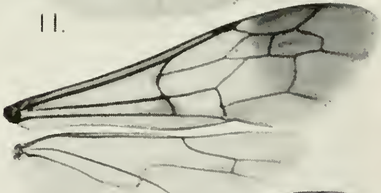

7.

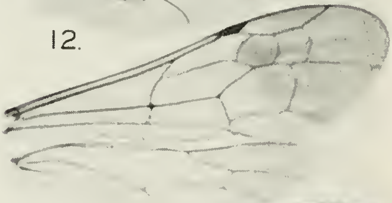

8.

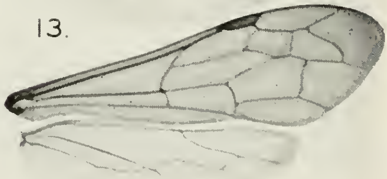

9.


10.

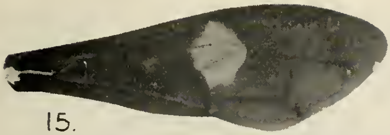

11.

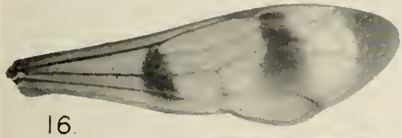

12.

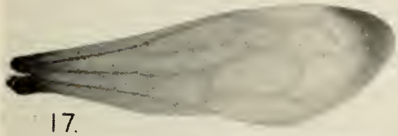

13.

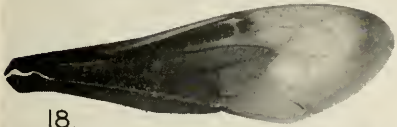

14.

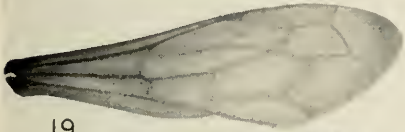
WINGS OF GENERA OF PEPSINAE AND CEROPALINAE

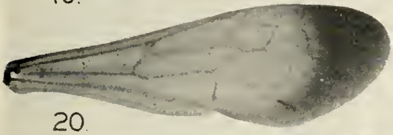

15.

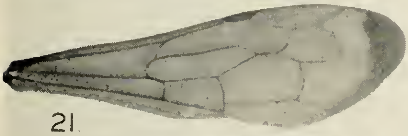

16.

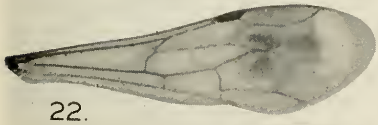

17.

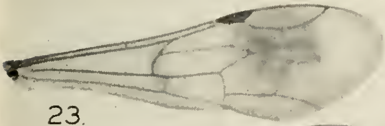

18.

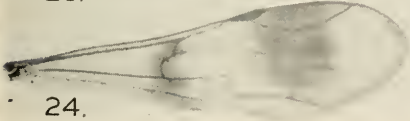

19.

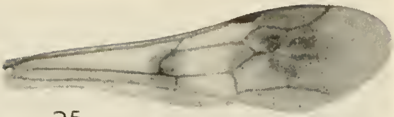

20.

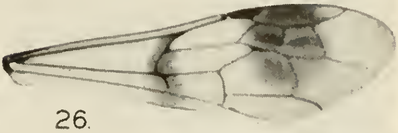

21.

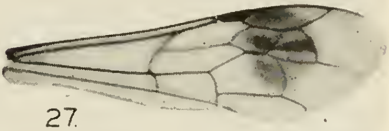

22.

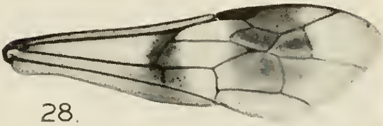

23.

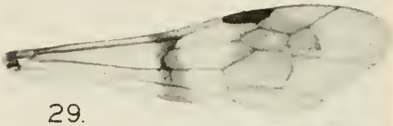

24.

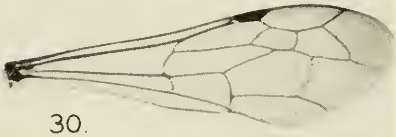

25.

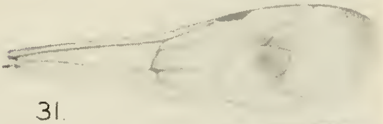

26.

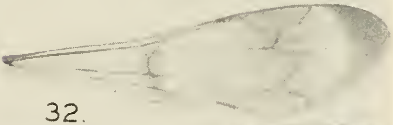

27.

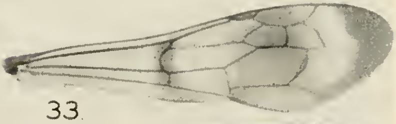

28.

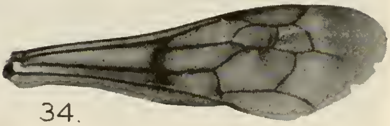

29.


30.

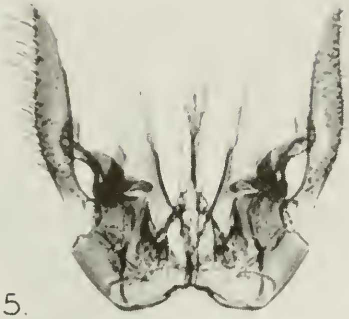

31.


32.

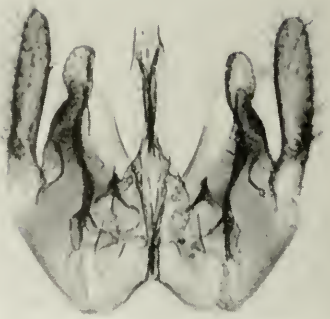

33.


34.

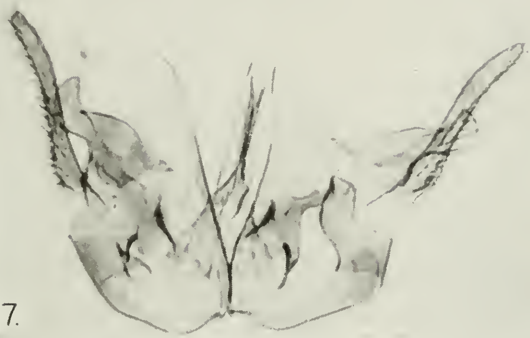
FOREWINGS OF PEPSINAE



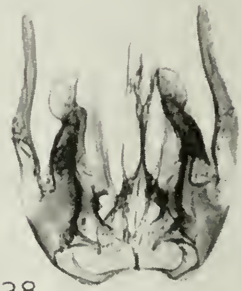
35.



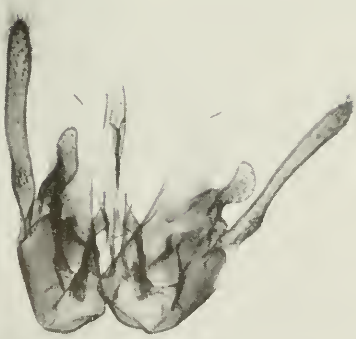
36.



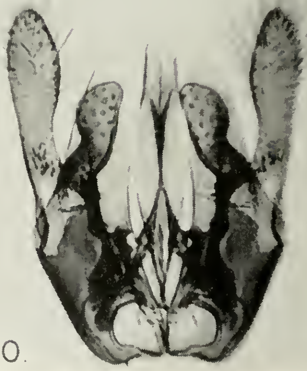
37.



38.

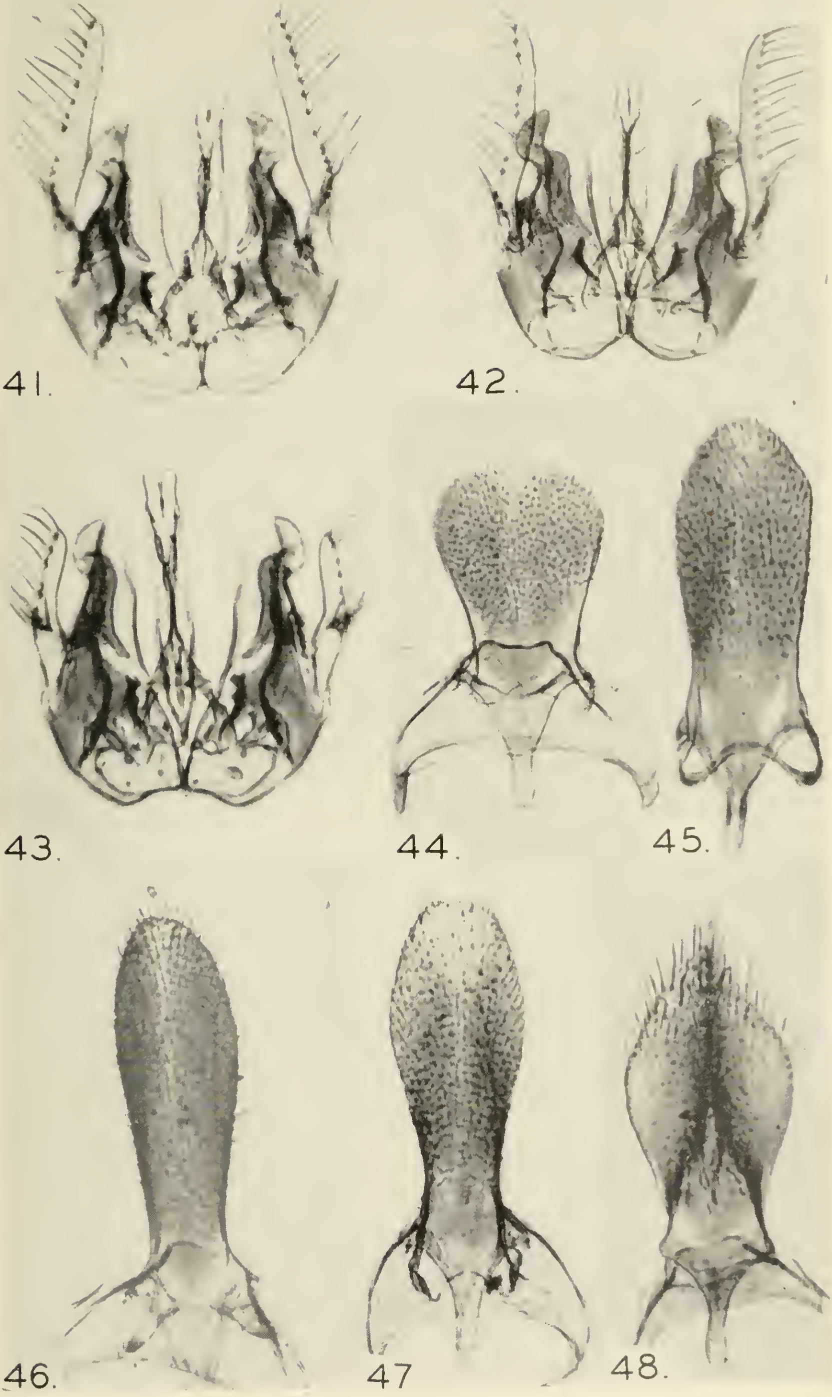


39.



40.

Male Genitalia of Minagenia Species



41. 42. 43. 44. 45. 46. 47 48.

MALE GENITALIA AND SUBGENITAL PLATES OF MINAGENIA SPECIES

by Miss Louise Russell; comparisons with and notes on the types in London and Oxford were made by Mr. I. H. H. Yarrow; Dr. H. E. Evans sent a copy of his notes on the Provancher types; and Mr. K. V. Krombein sent notes on the Provancher types taken in 1953. Assistance from these persons and from the curators of institutions and museums at Washington, Philadelphia, Cambridge, Ithaca, Raleigh, Lawrence, and San Francisco, who made the types under their care available for study, has permitted the kind of nomenclatorial work that was sorely needed in this group. Their help is gratefully acknowledged.

Many of Banks' new species were described from a syntype series, without designation of an individual type. Often the number of specimens involved and sometimes even the sex is not stated. For nomenclatorial purposes I have designated a lectotype in the specific synonymy wherever one of Banks' new names was based on more than one specimen without designation of the single type. The specimen so designated is usually the one of the series labeled "type" by Banks, though heretofore not designated as such in a publication.

To my wife goes special acknowledgement for the many ways in which she assisted with this study, particularly in recording distributional data and preparing the maps. The maps are intended to give a quick comprehension of the known distribution, with a spot for each definite locality. Indefinite localities, like a state, or localities not in the atlases at hand, could not of course be indicated by definite spots and so had to be omitted. They are included, however, in the lists of specimens studied.

Terminology

The Rohwer and Gahan (1915, Proc. Ent. Soc. Washington, vol. 18, pp. 20–76) system of wing vein and cell terminology is used. This terminology is explained in figure 1,*a*. The subgenital plate is the last visible sternite—the apparent seventh but actual eighth (or the morphological ninth) abdominal sternite in the male, and the sixth abdominal sternite in the female. The squama, or paramere, of the male genitalia is the lateral distal piece, usually the largest, most lateral, most projecting, and most conspicuous paired part of the external genitalia.

An ability to distinguish between males and females is presupposed in the keys and descriptions. Males have thirteen segments in the antenna (or only twelve in *Pepsis formosa*), seven visible abdominal sternites, no sting, and a more slender build. Females have twelve segments in the antenna, six visible abdominal sternites, a sting that may frequently be seen exserted, a more robust build, and many minor differences from the males in proportions and in the vestiture and bristles.

Taxonomy

The Psammocharidae belongs in the Vespoidea and, like the rest of the Vespoidea, is probably a derivative of some scoliidlike stock. Within the family are two main lines of evolution—the pepsine, which is included entirely in the subfamily Pepsinae, and the psammocharine, which is included in the subfamilies Psammocharinae and Ceropalinae. Many authors recognize more than the three subfamilies just mentioned. I have studied most of the material available in the United States, and though this does not include many of the critical exotic genera it is enough to convince me that probably all of the additional subfamilies recognized by other authors should be merged with one of these three. *Homonotus* and *Aporus*, often segregated in the Homonotinae or Aporinae, definitely belong in the Psammocharinae. *Irenangelus* and *Notocyphus* I place in the Ceropalinae, and the "Macromerinae" is considered a tribe of the Pepsinae. The separation of *Pepsis* as a subfamily distinct from other pepsine genera seems quite unjustified. The few "Claveliinae" I have seen are aberrant Pepsini. *Olixon* and related genera, often referred to the Psammocharidae, belong in the Rhopalosomatidae, as evidenced by the articulation between the first and second abdominal segments, upcurved sting, winged tarsal segments of some females, and lack of a distinct transverse groove on the mesopleuron.

Explanation of Figure 1

a, Wings of a member of the subfamily Psammocharinae, to illustrate terminology: Cells of Forewing: a, Costal; b, median; c, submedian; d, anal; e, stigma; f, first cubital; g, second cubital; h, third cubital; i, fourth cubital; j, radial; k, first discoidal; l, second discoidal; m, third discoidal; n, first brachial; o, second brachial; p, pocket of second discodial. Cells of Hind Wing: q, Costellan; r, mediellan; s, submediellan; t, anal lobe; u, radiellan; v, cubitellan; w, discoidellan; x, anellan. Veins of Forewing: 1, Costa; 2, subcosta; 3, medius; 4, submedius; 5, metacarpus; 6, radius; 7, cubitus; 8, discoideus; 9, subdiscoideus; 10, first intercubitus; 11, second intercubitus; 12, third intercubitus; 13, basal; 14, nervulus; 15, first recurrent; 16, second recurrent. Veins of Hind Wing: 17, Costella; 18, subcostella; 19, mediella; 20, submediella; 21, metacarpella; 22, radiella; 23, cubitella; 24, discoidella; 25, intercubitella; 26, nervellus.

b, Side view of thorax of *Cryptocheilus severini*, to show the transverse groove on the mesopleuron characteristic of all psammocharids.

c, Side view of abdomen of *Priocnemis minorata*, ♀, to illustrate the groove on the second sternite characteristic of the Pepsinae, and the lateral crease on the first tergite.

d, Part of middle leg of a member of the subfamily Psammocharinae, to show the spinelike setae set in pits on the apical part of the femur, characteristic of this subfamily.

e, Apex of hind tibia of *Priocnemioides unifasciatus*, ♀, to show the uniform length of its apical spinelike setae, characteristic of the Pepsinae and Ceropalinae, and the dorsal row of teeth characteristic of many Pepsinae.

f, Apex of hind tibia of a member of the subfamily Psammocharinae, to show the uneven length and splaying of its apical spinelike setae, characteristic of most members of this subfamily.

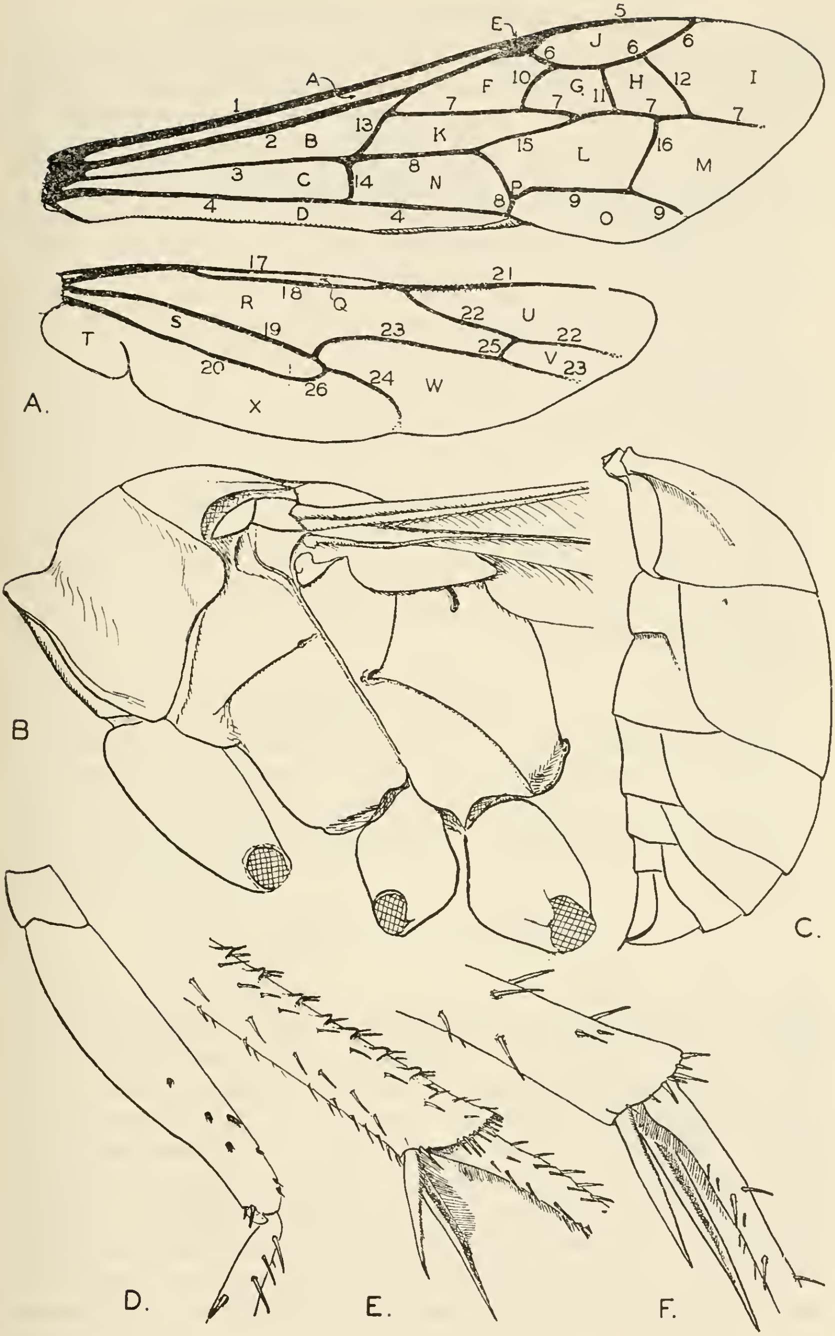

5
E
J
6
6
6
A
10
F
G
11
H
12
I
1
7
7
7
7
13
K
2
B
15
L
16
M
3
C
14
8
N
P
8
9
9
4
D
4
O
17
21
18
Q
R
22
U
S
19
23
T
25
22
V
23
20
26
24
W
X
A.
B
C.
D.
E.
F.

FIGURE 1.—(For explanation see opposite page.)

Key to the subfamilies of Psammocharidae

1. Second sternite of female (and often of male) with a sharp transverse groove (fig. 1,*c*); middle and hind femora never with one or several subapical spinelike bristles set in grooves or pits; last segment of tarsi sometimes with a pair of sublateral ventral rows of bristles, never with a distinct median ventral row; subdiscoidal vein never with a definite downward deflection at its base (thus the lower inner corner of the third discoidal cell is simple and without a pocket); dorsal edge of hind tibia frequently with a series of teeth (fig. 1,*c*); spinelike bristles at apex of hind tibia of rather uniform length, not splayed (fig. 1,*e*) . . . . **Pepsinae (p. 8)**

   Second sternite of both sexes without a sharp transverse groove, though sometimes with a broad, weak, transverse impression; middle and hind femora usually with one or several apical dorsal spinelike bristles set in grooves or pits (fig. 1,*d*) **2**

2. Spinelike bristles at apex of hind tibia rather long, irregular in length and spacing, and splayed (fig. 1,*f*); subdiscoidal vein of forewing usually deflected downward at its base, thus forming a small pocket at the lower inner corner of the third discoidal cell (P, fig. 1,*a*); middle and hind femora usually with one or several spinelike subapical bristles set in grooves or pits (fig. 1,*d*); preapical bristles on under side of last segment of tarsus, when present, arranged chiefly or entirely in a median longitudinal row; female subgenital plate without a median longitudinal keel or sharp fold; labrum often concealed beneath the clypeus; dorsal edge of hind tibia rarely with a longitudinal ridge or serration . . . . **Psammocharinae**[1]

   Spinelike bristles at apex of hind tibia shorter, of rather uniform length; subdiscoidal vein of forewing never with a definite downward deflection at its base (thus the lower inner corner of the third discoidal cell is simple and without a pocket); middle and hind femora usually without, or with small and inconspicuous spinelike bristles set in grooves or pits; preapical bristles on under side of last segment of tarsus, when present, often not arranged in a single median row; female subgenital plate with a longitudinal keel or sharp fold, at least apically; labrum exposed; dorsal edge of hind tibia smooth . . . . **Ceropalinae (p. 220)**

Subfamily PEPSINAE

The salient subfamily characters are listed in the key to subfamilies. The sharp transverse groove on the second sternite of all females (fig. 1,*c*) and some males is the easiest recognition mark. Some members of the other two subfamilies have a broad, weak, transverse impression in this same position which should not be confused with the sharp groove of the Pepsinae. The lower inner corner of the third discoidal cell is without a pocket, the spinelike bristles at the apex of the hind tibia are of rather uniform length and not splayed (fig. 1,*e*), and the dorsal edge of the hind tibia is often serrate. The first character will distinguish the Pepsinae from most of the Psammocharinae, but not from the Ceropalinae. The second character is held in common with a few Psammocharinae as well as with the Ceropalinae. The serrate dorsal edge of the hind tibia, though a helpful recognition mark is not reliable as a subfamily character, being absent in many groups and present in a few of the Psammocharinae (e.g., *Priochilus*).

---

[1] The Psammocharinae are not treated further in this paper. The Nearctic species have been revised by Evans and Bradley in the papers referred to on page 2.

In addition to the key characters, it should be mentioned that the thorax of the Pepsinae does not have the indefinable oblique and streamlined shape so characteristic of the other two subfamilies.

There are two tribes, distinguishable as indicated in the key.

Key to the tribes of the subfamily Pepsinae

1. Cubital vein of forewing present and pigmented to the wing margin (except in *Priocnessus* and in a few species of other genera); first tergite in dorsal view with the sides straight or slightly convex, laterally with a crease which marks off an epipleurite (fig. 1,*c*); parapenial lobe of male genitalia not decurved at the apex to form a hook . . . . **Pepsini** (p. 9)

   Cubital vein of forewing evanescent at the tip, not reaching the wing margin; first tergite in dorsal view with the sides usually somewhat concave toward the base, laterally usually without a crease marking off an epipleurite (in the Western Hemisphere, only *Phanagenia* has this crease); parapenial lobe of male genitalia rather slender, decurved at the apex to form a hook . . . . **Macromerini** (p. 140)

Tribe Pepsini

Cubital vein of forewing usually reaching wing margin (pl. 1, figs. 1–10); hind tibia usually with an external dorsal serration (fig. 1,*e*); first abdominal tergite broad, not constricted subbasally, so that when seen from above the sides are straight or weakly convex; suture or fold separating epipleurum of first abdominal segment from the tergite always present (fig. 1,*c*); last tergite of male seldom with a dorsal whitish spot; parapenial lobe of male genitalia not decurved apically to form a hook.

This tribe includes some of the largest and showiest species of the family (especially in *Pepsis* and *Hemipepsis*), some of medium size, and some of small size (as in *Dipogon*, *Priocnemis*, and *Calicurgus*). Some of the genera are easily distinguished, but a large complex including the Nearctic *Chirodamus*, *Priocnemioides*, and *Cryptocheilus*, and a number of additional exotic genera (*Cyphononyx*, *Monodontonyx*, *Mygnimia*, *Paracyphonyx*, etc.) presents a confusing array of species with types intermediate to almost any generic limits that may be selected. In this situation, there are the alternatives of including all in one broad genus, embracing many groups of varying size and distinctness, or attempting a larger or smaller number of generic separations, some of which would be difficult to defend because of intermediate species. I have chosen the latter course, because it is closer to previously published classifications, results in little generic difficulty in the Nearctic fauna, and is more in line with the narrower generic concepts used in the rest of the tribes. A study of a larger portion of the world fauna, however, may show a need for some different groupings.

Key to the Nearctic genera of Pepsini

1. Mandible with three teeth (including the apical point as a tooth); dorsal edge of hind tibia smooth in both sexes; female with cardo of each maxilla giving rise to a fascicle of long curved hairs . . . . **Dipogon** (p. 115)

Mandible with two teeth (a large apical point plus a smaller subapical internal point; in a few species of *Chirodamus* from the Australian region there is a more or less distinct third tooth); dorsal edge of hind tibia of female (and often of male) with a serrate row of teeth (fig. 1, *e*); cardo of maxilla without a fascicle of long hairs in either sex **2**

2. Second recurrent vein meeting the second cubital cell at about its apical 0.1 (pl. 1, fig. 3); empodium about 0.75 as wide as the subapical width of the last tarsal segment, its apical fringe of bristles containing about 14 to 40 bristles; first discoidal cell occupied basally by a distinct subcircular irregularity in the membrane (pl. 1, fig. 3); large or very large species. **Hemipepsis** (p. 32)

Second recurrent vein meeting the second cubital cell at or basad of its apical 0.25; empodium about 0.5 as wide as the subapical width of the last tarsal segment, its apical fringe of bristles containing about 8 to 10 bristles; first discoidal cell not occupied basally by an irregularity in the membrane, or if so the irregularity less distinct than in *Hemipepsis* **3**

3. Marginal cell separated apically from the costal margin of the wing, so that the tip of the cell is rounded (pl. 1, fig. 2); second cubital cell receiving the second recurrent vein before its basal 0.33; large or very large species. **Pepsis** (p. 25)

Marginal cell apically adjacent to the costal margin of the wing, so that the tip of the cell is pointed or subtruncate; second cubital cell receiving the second recurrent vein beyond its basal 0.4 . . . . **4**

4. Second intercubital vein quite straight (pl. 1, fig. 1); legs and antenna short and stout, the second segment of flagellum in the Nearctic species 1.5 to 4.5 as long as wide; clypeus (in the Nearctic species) wide, short, and rather flat; brush on inner side of hind tibia broadly continuous to the apex. **Chirodamus** (p. 11)

Second intercubital vein usually more or less curved (straight in *Priocnemioides* and in some *Cryptocheilus*); legs and antenna longer and more slender, the second segment of flagellum rarely less than 3.2 as long as wide; clypeus longer and more convex; brush on inner side of hind tibia often with a subapical constriction or interruption **5**

5. Cubital vein not quite reaching the wing margin and the nervellus ending at or distad of the juncture of cubitella with discoidella (pl. 1, fig. 4); clypeus very large . . . . **Priocnessus** (p. 40)

Cubital vein usually reaching the wing margin, or if not (e. g., some species of *Priocnemis*), then the nervellus ending distinctly basad of the juncture of cubitella with discoidella **6**

6. Under side of last tarsal segment with two longitudinal rows of bristles; second intercubital vein straight or evenly curved **7**

Under side of last tarsal segment without any preapical bristles or with a very few that are not arranged in two regular longitudinal rows; second intercubital vein rather straight anteriorly, but strongly curved posteriorly . . **8**

7. Carina on mesosternum in front of each middle coxa angled medially and at the angle usually produced as a tooth; nervellus ending beyond, at, or just before the juncture of cubitella with discoidella (pl. 1, fig. 5). **Priocnemioides** (p. 49)

   Carina on mesosternum in front of each middle coxa evenly curved; nervellus ending distinctly before the juncture of cubitella with discoidella (pl. 1, fig. 6). **Cryptocheilus** (p. 67)

8. Anal lobe elliptical, the apical half of its hind margin evenly curved (pl. 1, fig. 7); fore tibia of female without a single, unusually stout bristle on its outer apical corner; nervulus beyond the basal vein by about 0.7 to 1.3 its length (pl. 1, fig. 7); pronotum of normal length . . . . **Priocnemis** (p. 80)

   Anal lobe subtriangular, the apical half of its hind margin rather straight (pl. 1, fig. 8); fore tibia of female with a single, very stout, blunt, spinelike bristle at its outer apical corner; nervulus at the basal vein or beyond it by less than 0.3 its length (pl. 1, fig. 8); pronotum quite short. **Calicurgus** (p. 108)

Genus *Chirodamus* Haliday

Chirodamus Haliday, 1837, Trans. Linn. Soc. London, vol. 17, p. 326. Type: *Chirodamus kingii* Haliday; monobasic.

Calopompilus Ashmead, 1900, Canadian Ent., vol. 32, p. 188. Type: *Pompilus maculipennis* Smith; original designation.

Dinocnemis Banks, 1925, Bull. Mus. Comp. Zool., vol. 67, p. 336. Type: *Pompilus* (*Priocnemis*) *fortis* Cresson; designated by Bradley, 1944.

Onochares Banks, 1933, Psyche, vol. 40, p. 9. Type: (*Onochares brazoria* Banks) = *heiligbrodtii* Cresson; original designation.

Trichocurgus Haupt, 1937, Zeitschr. Naturw. (Halle), vol. 91, pp. 127, 134. Type: *Pompilus monachus* Smith; original designation.

Chrysocurgus Haupt, 1937, Zeitschr. Naturw. (Halle), vol. 91, pp. 127, 134 (new synonymy). Type: *Sphex nitida* Fabricius; original designation.

Derochilus Banks, 1941, Canadian Ent., vol. 73, pp. 119, 120. Type: *Pompilus* (*Priocnemis*) *validus* Cresson; original designation.

Reedimia Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 482. Type: *Agenia hirsutula* Spinola; original designation.

Anacyphonyx Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 520 (new synonymy). Type: *Anacyphonyx fidelis* Banks; original designation.

Medium or large-sized, stout species, the Nearctic species with the forewing 6 to 18 mm. long; clypeus broad, short, and rather flat (smaller and more convex in some exotic species); mandible in the Nearctic species with two teeth, in some New Zealand species with a more or less distinct third tooth; pronotum long, flat, its hind margin arcuate; second intercubital vein quite straight, vertical or oblique; second recurrent vein reaching the second cubital cell just beyond its middle; cubital vein reaching the wing margin; base of first discoidal cell containing a moderately distinct subcircular irregularity in the membrane; nervulus beyond the basal vein by about 0.6 its length; nervellus ending somewhat before, at, or somewhat beyond the juncture of cubitella with discoidella; anal lobe about 0.5 to 0.8 as long as submediella (pl. 1, fig. 1); hind tibia with a weak or distinct dorsal serration in females, without a distinct serration in males; brush on inner side of hind tibia broad, without a distinct subapical constriction; last segment of tarsi short, with or without preapical spinelike bristles beneath, these when present arranged in a short irregular pair of rows, often the basal bristles displaced toward, or on the midline; tooth on tarsal claws variable.

The genus *Chirodamus* appears to be one of the most primitive of the family, as evidenced by the lack of specialization in the venation and leg bristles, and by the general scolioid habitus. Its distribution is of the Marsupial type. The Nearctic species divide into two species groups, which together form a genus amply distinct from others in our region, but some of the species in the Neotropic and Australian regions approach the more primitive members of *Priocnemioides* and other genera of Pepsini, and in these areas a clear generic separation is difficult.

The species show diversity of structural characters to a degree that in other parts of the family has called for generic distinctions. One can see by the extensive generic synonymy that some authors have used these as generic characters in the present group also. While recognizing that there are some well marked species groups in the complex, I am not convinced that there should be more than one genus used. This is another of the generic problems with which the family is replete, but recent progress has demonstrated that much of the haziness of generic limits is subjective and may be clarified with study. It is hoped that *Chirodamus* will prove to be another such case. The critical species are mostly in southern South America and in the Australian region, areas in which North American collections are not strong.

Besides the genotype species mentioned in the synonymy, the following extralimital species should be referred to *Chirodamus*. *Cryptocheilus manni* Banks 1928, *Calopompilus fraternus* Banks 1946, *C. helas* Banks 1946, *C. erebus* Banks 1946, *C. parvulus* Banks 1946, *Reedimia infernalis* Banks 1946, *Anacyphonyx rosasi* Banks 1946, and *A. metallica* Banks 1946. These are all Neotropic species which have not previously been referred to *Chirodamus*. I have studied their types in Cambridge, *Anacyphonyx metallica* being represented there only by the paratype.

Keys to the Nearctic species of Chirodamus

MALES

1. Anal lobe about 0.55 as long as the submediella; subgenital plate either ligulate with a raised margin, or with a deep and broad apical semicircular emargination; outer claw of fore tarsus with a short erect tooth; pubescence of body and head rather sparse, that on the abdominal tergites sparse enough so that the tergites appear shiny. ALBOPILOSUS GROUP **2**

Anal lobe about 0.75 as long as the submediella (pl. 1, fig. 1); subgenital plate usually subcircular, evenly and strongly concave, its free margin with a fringe of longer hairs; outer claw of fore tarsus with a long subappressed tooth; pubescence of body and head dense, that on the abdominal tergites dense enough that the tergites appear dull. PYRRHOMELAS GROUP . . . 3

2. Subgenital plate broadly ligulate with the apex subtruncate; genitalia not ordinarily visible beyond the sugenital plate; longer hairs of thorax whitish . . . . 1. **albopilosus** (Cresson)

Subgenital plate crescent shaped (due to a deep and broad apical semicircular emargination); genitalia ordinarily visible beyond the subgenital plate as a pair of divergent, hairy, fingerlike processes; longer hairs of thorax black . . . . 2. **fortis** (Cresson)

3. Forewing mostly orange 4

Forewing black, or black with a median orange spot. 6

4. Forewing with a subapical fuscous cloud in addition to the fuscous apical margin; temple about 0.5 as long as the eye . . . . 3. **deceptus** (Banks)

Forewing without a subapical fuscous cloud; temple about 0.58 to 0.75 as long as the eye 5

5. Apical margin of fifth sternite weakly emarginate; sixth sternite conspiciously punctate; pleura and propodeum dull; basal infuscation of forewing restricted to a distance beyond the edge of the tegula equal to about 1.5 the width of the tegula . . . . 6. **heiligbrodtii** (Cresson)

Apical margin of fifth sternite strongly emarginate; sixth sternite inconspicuously punctate, smooth; pleura and propodeum somewhat shining; basal infuscation of forewing restricted to a distance beyond the edge of the tegula equal to about 2.5 the width of the tegula . 4. **pyrrhomelas** (Walker)

6. Tibiae and abdomen brownish red; propodeum with numerous coarse punctures in addition to the dense fine punctures . . . . 8. **validus** (Cresson)

Tibiae and abdomen black; propodeum with scattered medium-sized punctures in addition to the dense fine punctures. 7

7. Hair on fifth sternite about 1.3 as long as the length of the sternite; transverse groove on second sternite foveolate; forewing with a median orange spot (pl. 2, fig. 15). . . . . 5. **maculipennis** (Smith)

Hair on fifth sternite about 0.5 as long as the length of the sternite; transverse groove on second sternite not foveolate; forewing entirely black.
7. **ferocul is** (Banks)

FEMALES

1. Anal lobe about 0.55 as long as the submediella; head and body with moderately dense pubescence, the pleura shiny, with their setiferous punctures distinctly separated; teeth on outer side of hind tibia subobsolete. ALBOPILOSUS GROUP 2

Anal lobe about 0.75 as long as the submediella (pl. 1, fig. 1); head and body with very dense pubescence, the pleura dull, with their setiferous punctures contiguous; teeth on outer side of hind tibia distinct. PYRRHOMELAS GROUP 3

2. Second flagellar segment about 2.0 as long as wide; forewing about 6.5 to 10 mm. long, moderately infuscate; head and body a little less densely and more coarsely punctate; dorsal face of pronotum a little shorter.
1. **albopilosus** (Cresson)

Second flagellar segment about 2.4 as long as wide; forewing about 10 to 15 mm. long, strongly infuscate; head and body a little more densely and more finely punctate; dorsal face of pronotum a little longer . 2. **fortis** (Cresson)

3. Forewing orange except at the base and apex. 4
   Forewing infuscate or black, or black with a median orange spot 6
4. Temple about 0.4 as long as the eye; second flagellar segment about 4.4 as long as wide. . . . . 3. **deceptus** (Banks)
   Temple about 0.65 to 1.2 as long as the eye; second flagellar segment about 2.5 to 3.5 as long as wide 5
5. Propodeum above with coarse transverse wrinkles; coarse punctures on sternites separated by about 4.0 their diameter; bases of wings infuscate nearly to the apex of the anal lobe (pl. 1, fig. 1). . . . . 4. **pyrrhomelas** (Walker)
   Propodeum nearly or quite without wrinkles; coarse punctures on sternites separated by about 1.7 their diameter; bases of wings infuscate only at the extreme base. . . . . 6. **heiligbrodtii** (Cresson)
6. Forewing with a large median orange spot (pl. 2, fig. 15); abdomen entirely black . . . . 5. **maculipennis** (Smith)
   Forewing entirely black 7
7. Third tergite entirely black. . . . . 7. **feroculis** (Banks)
   Third tergite mostly or entirely brownish red . . . . . 8. **validus** (Cresson)

ALBOPILOSUS GROUP

Head and body shiny, with well separated setiferous punctures and with the clothing hairs not unusually dense and fine; anal lobe about 0.55 as long as the submediella; fifth tarsal segment without discal bristles beneath; all tarsal claws of both sexes with a small erect median tooth; teeth on outer side of hind tibia of female showing as faint elevations at the bristle bases; male abdomen without a constriction between the first two tergites; male subgenital plate various, but never spherically concave with a fimbriate margin.

The species included are the Nearctic *albopilosus* and *fortis*. The New Zealand *Pompilus monachus* Smith, 1855, seems the nearest relative of this species group.

1. *Chirodamus albopilosus* (Cresson)

Pompilus (*Agenia*) *albopilosus* Cresson, 1867, Trans. Amer. Ent. Soc. vol. 1, p. 125, ♂. Lectotype: ♂, West Virginia (Philadelphia).

Priocnemis fortella Banks, 1915, Canadian Ent., vol. 47, p. 401, [♀]. Lectotype: ♀, Great Falls, Va., June 12, N. Banks (Cambridge).

Pseudagenia najacra Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 203, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

Male: Forewing 6 to 8 mm. long; subgenital plate broadly ligulate, with the apex subtruncate and the lateral edges raised; genitalia not ordinarily visible beyond the subgenital plate.

Black. Pubescence light gray, the longer hairs on the head and scape blackish; wings subhyaline, the apical half of the forewing lightly infuscate.

Female: Forewing 6.5 to 10 mm. long; head and body with relatively sparse and coarse punctures; second flagellar segment about

2.0 as long as wide; dorsal face of pronotum about 0.3 as long as wide.

Black. Pubescence blackish; forewing moderately infuscate, the hind wing a little paler.

Specimens (45♂, 18♀): From Georgia (Neel Gap and Rabun Bald); Maryland (Cabin John, Glen Echo, and Plummers Island); New York (Ithaca); North Carolina (Canton, Hickory, Highlands, Hot Springs, Mount Mitchell at 6,400 ft., Mount Pisgah at 4,600 ft. and at 5,000 to 5,749 ft., and Raleigh); South Carolina (Columbia); Virginia (Dead Run, Great Falls, Skyline Drive, and Stonyman); and West Virginia.

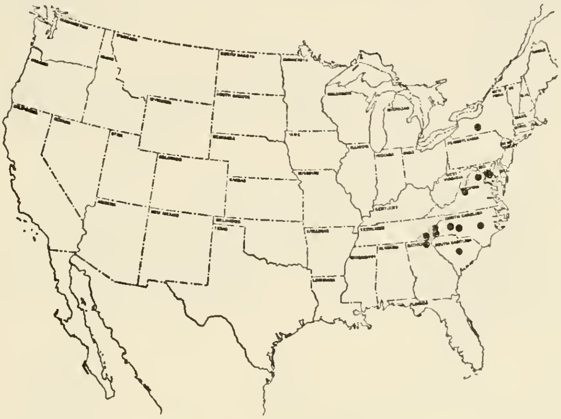


Figure 2.—Localities for *Chirodamus albopilosus*.

Collection dates are from late in May to early in September and seem to indicate two generations a season. Males begin to emerge in early summer (May 22 at Neel Gap, Ga.; May 28 at Columbia, S. C.; June 1 at Glen Echo, Va., and at Cabin John, Md., etc.), remain numerous through June, and appear to be uncommon in the first third of July. From July 9 to 25 there are no records of males captured, and males after July 25 presumably represent a second generation, which disappears late in August. Females appear a little later in the season than males and persist into early September. Early and late records for females are June 5 at Rabun Bald, Ga.; June 12 at Great Falls, Va.; Sept. 2 at 4,600 ft. on Mount Pisgah, N. C.; and Sept. 5 at 5,000 to 6,711 ft. on Mount Mitchell, N. C. The usual habitat seems to be rich moist woods.

This is a species of the Allegheny faunal area from New York to Georgia. Adults occur from early to late summer.

2. *Chirodamus fortis* (Cresson)

Pompilus (*Priocnemis*) *fortis* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 113, ♀. Lectotype: ♀, New York (Philadelphia).

Pompilus (*Agenia*) *nigropilosus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 124, ♂. Type: ♂, West Virginia (Philadelphia).

Pseudagenia mariva Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 202, ♂. Type: ♂, Linville Falls, N. C. (Raleigh).

Male: Forewing about 11 mm. long; subgenital plate crescent shaped because of a broad deep semicircular emargination; genitalia visible beyond the subgenital plate as a pair of divergent fingerlike lobes that form a Y, both these lobes and the apical emargination of the subgenital plate densely setose.

Black. Pubescence dark gray, the longer hairs blackish; wings moderately infuscate, paler on the basal 0.4.

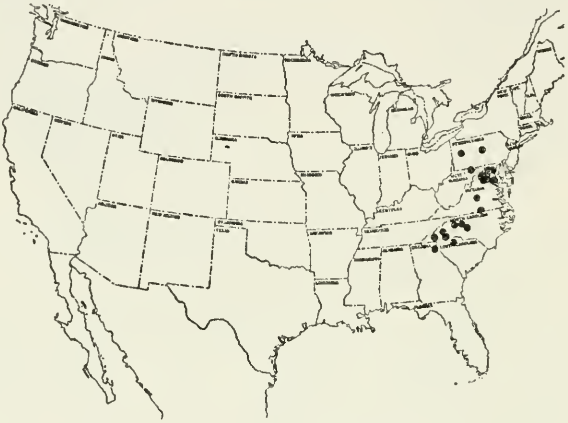


Figure 3.—Localities for *Chirodamus fortis*.

Female: Forewing 10 to 15 mm. long; head and body with the punctation finer and denser than in *C. albopilosus;* second flagellar segment about 2.4 as long as wide; dorsal face of pronotum about 0.4 as long as wide.

Black. Pubescence black; wings heavily infuscate.

Specimens (5♂, 31♀): From District of Columbia; Georgia (Neel Gap and Rabun Bald); Maryland (Cabin John, Frostburg, Plummers Island, and Takoma Park); New York; North Carolina (Asheville, Boone, Cedar Mt., Grandfather Mt., Highlands, and Linville Falls); South Carolina (Greenville County); Virginia (Arlington, Buckingham County, Chain Bridge, Glencarlyn, Falls Church, and Nelson County); and West Virginia.

Dates of collection are rather evenly distributed from May 29 to Sept. 22. Mr. David Shappirio tells me that this species is found in woods, often running over the dead leaves.

This species occurs in the Allegheny faunal area from Pennsylvania to Georgia.

PYRRHOMELAS GROUP

Head and body usually dull, with dense, small, adjacent setiferous punctures and with the clothing hairs unusually dense and fine. (Certain parts of the body in one or both sexes may be shiny.) Anal lobe about 0.75 as long as the submediella; fifth tarsal segment of female usually with discal bristles beneath; front tarsal claws of male with a long declined tooth (the tooth is especially long on the outer claw), the rest of the claws of both sexes with a short, more or less erect tooth; teeth on outer side of hind tibia of female small, but sharp and distinct; male abdomen with an evident constriction between the first two tergites; male subgenital plate usually spherically concave, hairy, with the marginal hairs longer to make a fimbriate border (exception: *C. deceptus*).

The species included are the Nearctic *deceptus, pyrrhomelas, maculipennis, heiligbrodtii, feroculis,* and *validus.*

3. *Chirodamus deceptus* (Banks)

Priocnemis decepta Banks, 1926, Canadian Ent., vol. 58, p. 201, [♀]. Type: ♀, Fedor, Lee County, Tex. (Cambridge).

Male: Forewing 9 mm. long; temple 0.5 as long as the eye (about 0.6 as long as the eye in all other Nearctic species of the group except *C. heiligbrodtii*) tooth on outer claw of fore tarsus about 0.6 as long as the part of the claw beyond it, the two parts widely separated basally but somewhat convergent apically; mesopleuron a little shining, with dense fine punctures and scattered indistinct larger punctures; abdomen with a very weak constriction between the first and second tergites; apical margin of fifth sternite weakly concave; subgenital

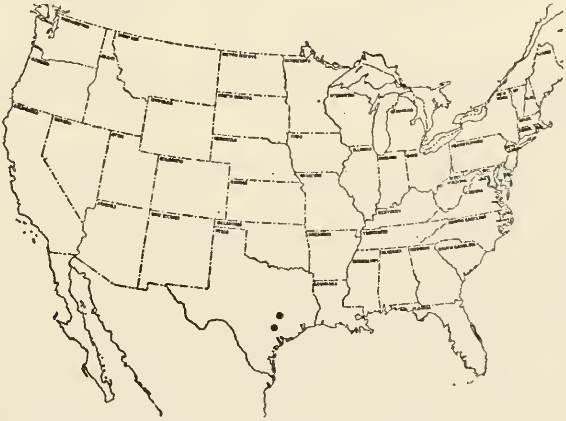


Figure 4.—Localities for *Chirodamus deceptus.*

plate approximately flat, covered below with long, dense, oblique hairs, its apex truncate.

Inner orbit with a yellowish stripe; forewing with a fuscous cloud in the second and third cubital and second discoidal cells. Otherwise colored like the female.

FEMALE: Forewing 10.5 to 13 mm. long; temple 0.4 as long as the eye (about 0.7 as long as the eye in all other Nearctic species of the group except *C. heiligbrodtii*); second flagellar segment 4.4 as long as wide; propodeum with weak, coarse, transverse wrinkles; larger punctures on sternites sparse and indistinct.

Black. Wings orange, their extreme bases and the apical margin of forewing fuscous.

This species is atypical of the *pyrrhomelas* group and somewhat transitional to the *albopilosus* group. An undescribed species from Zacapú, Michoacán, México (Evans and Berkeley), is a connecting link between *deceptus* and more typical species of the *pyrrhomelas* group. The male and female of *deceptus* are associated on slender evidence and future studies may prove the association incorrect.

SPECIMENS: ♂ "Birkmann Coll." (Cambridge). ♂, Florida (St. Paul). ♀, Bastrop County, Tex. (Townes). ♀ (type), Fedor, Lee County, Tex., June 1910 (Cambridge). ♀, no data (College Station, Tex.).

4. *Chirodamus pyrrhomelas* (Walker)

PLATE 1, FIGURE 1

Pompilus pyrrhomelas Walker, 1866, *in* Lord, The naturalist in Vancouver Island and British Columbia, vol. 2, p. 341, ♀. Type: ♀, British Columbia (London).

Cryptocheilus rugosus Banks, 1917. Bull. Mus. Comp. Zool., vol. 61, p. 101, ♀. Lectotype: ♀, Wawawai, Wash., "9–8–08," W. M. Mann (Cambridge).

Cryptocheilus inaequalis Banks, 1917. Bull. Mus. Comp. Zool., vol. 61, p. 102, ♂. Type: ♂, Camp Umatilla, Wash. (Cambridge).

MALE: Forewing 12 to 17.5 mm. long; tooth on outer claw of foretarsus about 0.35 as long as the part of the claw beyond it, the two parts distinctly divergent; mesopleuron subshining, with close fine punctures and with scattered larger punctures that are separated by about 3.0 their diameter; abdomen rather strongly constricted between the first and second tergites; apical margin of fifth sternite moderately concave.

Inner orbit with a yellowish stripe. Otherwise colored like the female.

FEMALE: Forewing 14 to 22 mm. long; second flagellar segment about 2.8 as long as wide; mesopleuron with the fine punctures extremely dense, a little denser than in the other Nearctic species of the genus; coarser punctures of mesopleuron a little larger than in the other Nearctic species of the genus; propodeum with coarse, irregularly transverse wrinkles; larger punctures on sternites scattered, separated by about 4.0 their diameter.

Black. Wings orange, the forewing with its basal 0.12± and its apical margin fuscous; hind wing with its basal 0.2± and its apical and hind margins fuscous. Specimens from the southern United States and especially from México tend to have the wings more reddish orange and the basal infuscation of the wings a little more extensive.

Specimens (71♂, 84♀): From Arizona (Carr Canyon at 7,500 ft. in the Huachuca Mts., Flagstaff, General Springs at 6,200 to 7,200 ft. in Coconino County, Oak Creek Canyon at 6,000 ft., Reddington, Rustlers Park at 9,000 ft. in the Chiricahua Mts., and Santa Rita Mts. at 5,000 to 8,000 ft.); British Columbia (Keremeos, Okanagan, Oliver, Robson, Salmon Arm, Summerland, and Vernon); California (Davis Creek in Modoc County, Gold Lake in Sierra County, Grove Lake in Siskiyou County, Hallelujah Junction in Lassen County, Meadow Valley at 3,500 to 4,000 ft. in Plumas County, Portola, Quincy, and Weed); Idaho (Boise, Carey, Coeur d'Alene, Council, Fraser, Kimberly, Lapwai, Lewiston, Moscow, and Sterling); Nevada (Austin, Ferguson Springs, Humboldt River, Reno, and Virginia City); New Mexico (Catron County at 7,000 ft.); Oregon (Blitzer Valley, Boardman, Corvallis, Dallas, Grizzly Butte, Heppner, Ione, Kings Valley, Klamath Lake, La Grande, Laidlaw, Milwaukie, Monroe, Portland, and Roseburg); Utah (Beaver Canyon, Beaver Range Mts. at 8,000 to 10,000 ft., Blacksmith Fork Canyon, Bountiful, Farmington, Garden City, Laketown, Logan, Oak Creek Canyon, Provo, Salt Lake, and Wildcat Valley in Beaver County); Washington (Almota, Camp Umatilla, Clarkston, Lake McElroy, Olympia, Perry, Pullman, Toppenish, Wawawai, and Yakima); and México (Cuernavaca, Paracho in Michoacán, and Real del Norte).

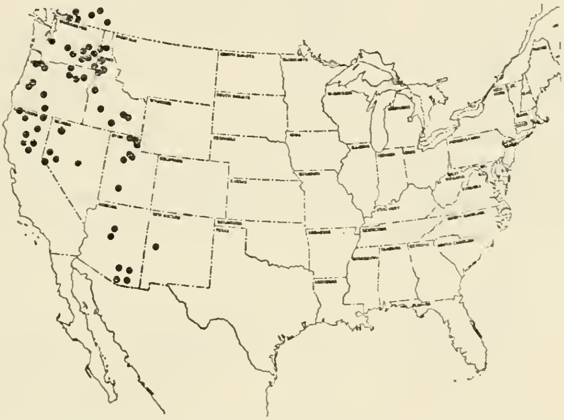


Figure 5.—Localities for *Chirodamus pyrrhomelas*.

Nearly all collection dates fall between July 1 and Sept. 16. Those outside this range are: June 27 at Camp Umatilla, Wash.; June 30 at Flagstaff, Ariz.; Sept. 28 at Clarkston, Wash.; Sept. 29 at Summerland, British Columbia; Sept. 30 at Logan, Utah; Oct. 13 at Pullman, Wash.; and Oct. 14 at Council, Idaho. One male was collected on the flowers of *Cleome serrulata*.

This species occurs from British Columbia to México, but not in the typical Rocky Mountain States of Montana, Wyoming, and Colorado. Apparently it is commonest in the Canadian Zone and south of Oregon is found only at higher altitudes. Adults are on the wing in the last half of summer and in early fall.

5. *Chirodamus maculipennis* (Smith)

PLATE 2, FIGURE 15

Pompilus maculipennis Smith, 1855, Catalogue of the hymenopterous insects in the British Museum, pt 3, p. 159, ♀. Type: ♀, North America (London).

MALE: Forewing 14 mm. long; tooth on outer claw of fore tarsus about 0.45 as long as the part of the claw beyond it, subparallel with it; mesopleuron subshining, with close fine punctures and larger punctures separated by about 3.0 their diameter; abdomen with a rather strong constriction between the first and second tergites; transverse groove on second sternite foveolate (not foveolate in the other Nearctic species of the genus); apical margin of fifth sternite rather strongly concave, its hair about 1.3 as long as the length of the sternite (the hair about 0.5 as long in the other Nearctic species of the genus).

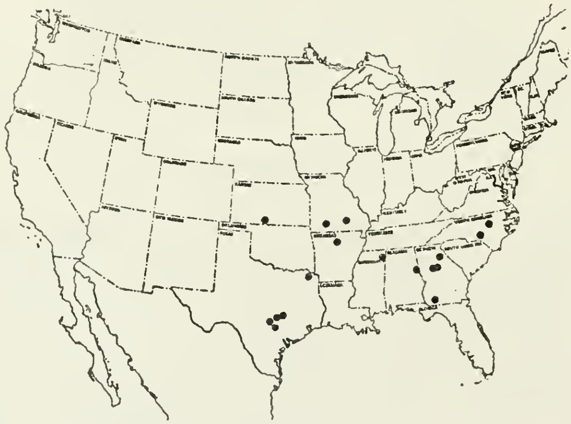


FIGURE 6.—Localities for *Chirodamus maculipennis*.

Black. Inner orbit without a yellowish stripe; wings black, the forewing with an oval or subcircular orange spot centering below the stigma and occupying 0.5 the width of the wing.

Female: Forewing 14 to 17 mm. long; second flagellar segment about 2.5 as long as wide; propodeum with fine weak transverse wrinkles; larger punctures on sternites very sparse, weak.

Black. Wings black, the forewing with an oval or subcircular orange spot centering below the stigma and occupying about 0.7 the wing width. A specimen from Barber County, Kans., has the spot in the forewing enlarged and rather diffuse.

Specimens: ♀, Wadley, Ala., H. H. Smith (Washington). ♀, Imboden, Ark., Byron C. Marshall (Washington). ♀, Atlanta, Ga., July 9, 1929, P. W. Fattig (Washington). ♀, Cornelia, Ga. (Ithaca). ♀, Head River, Ga., July 18, 1936, P. W. Fattig (Townes). ♀, Spring Creek, Decatur County, Ga., July 17 to 23, 1911, J. C. Bradley (Ithaca). ♀, Stone Mt., Ga., June 25, 1930, P. W. Fattig (Emory Univ.). ♀, Barber County, Kans., July 12 (Manhattan). ♀, Iuka, Miss., July 14, 1930, R. H. Beamer (Lawrence). ♀, Ozark Lake, Mo., Sept. 18, 1939, E. C. VanDyke (Berkeley). ♂, Van Buren, Ozark Mts., Mo., June 6, 1930, E. A. Pence (Ann Arbor). ♀, Mo., June (Washington). ♀, Raleigh, N. C., July 7, 1922, C. S. Brimley (Raleigh). ♀, Southern Pines, N. C., June 6, 1906, R. Woglum (Raleigh). ♀, Bastrop County, Tex., April 28, 1935, J. E. Gillaspy (College Station, Tex.). ♀, College Station, Tex., Oct. 8, 1937, E. B. Dubuisson (College Station, Tex.). 6♀, Fedor, Tex., May 12, 13, 21, 1905, May 1910, June 2, 1909, and Dec. 1909 (Cambridge). 2♀, Lee County, Tex., May 26 and Oct. 1910 (Cambridge). ♀, Oldenburg, Tex., Nov. 5, 1932, R. W. Strandtmann (Strandtmann). ♀, Paris, Tex., May 10, 1904, C. T. Brues (Cambridge). ♀, no data (Cambridge).

This species occurs in the warmer portions of the Southeastern States.

6. *Chirodamus heiligbrodtii* (Cresson)

Priocnemis heiligbrodtii Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 204, ♀. Type: ♀, Texas (Washington).

Agenia belfragei Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 205, ♂. Lectotype: ♂, Texas (Philadelphia).

Onochares brazoria Banks, 1933, Psyche, vol. 40, p. 9, ♀. Type: ♀, Fedor, Lee County, Tex. (Cambridge).

Male: Forewing about 15 mm. long; temple about 0.7 as long as the eye (about 0.6 as long as the eye in all other species except *C. deceptus*); tooth on outer claw of fore tarsus about 0.6 as long as the part of the claw beyond it, the two parts widely separated basally but somewhat convergent apically; mesopleuron dull, with very dense fine punctures and scattered indistinct larger punctures; abdomen with a weak constriction between the first and second tergites; apical margin of fifth sternite gently concave; sixth sternite with evident punctures, especially laterally (practically impunctate in the other species of the genus); subgenital plate not quite so concave as in related species, its apex distinctly notched.

Black. Inner orbit with a yellowish stripe; wings orange, their extreme bases, their apical margins, and the hind margin of the hind wing fuscous.

FEMALE: Forewing 9 to 18 mm. long; temple about 1.1 as long as the eye (about 0.7 as long as the eye in all other species except *C. deceptus*); second flagellar segment about 3.0 as long as wide; mesopleuron below with a median low round tubercle (this is absent or indistinct in the other members of the genus); propodeum smooth or sometimes laterally with fine weak transverse wrinkles; larger punctures on sternites relatively close, many of them separated by only about 1.7 their diameter.

Black. Wings orange, their extreme bases, their apical margins, and the hind margin of the hind wing fuscous.

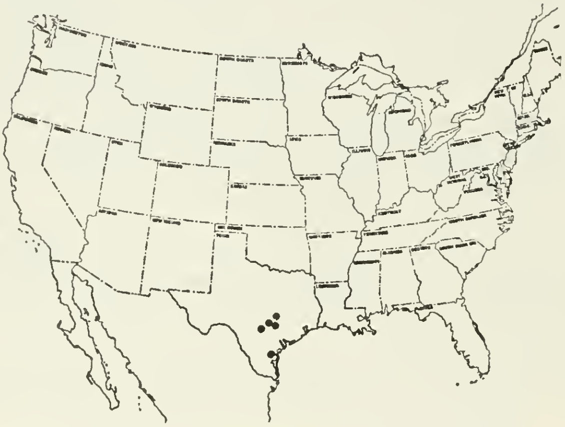


FIGURE 7.—Localities for *Chirodamus heiligbrodtii*.

SPECIMENS: ♀, Bastrop County, Tex., June 9, 1935, J. E. Gillaspy (College Station, Tex.). 4♂, Bexar County, Tex., Nov. 16, 1930, H. B. Parks (Parks and Townes). ♀, Bexar County, Tex., 1931, H. B. Parks (College Station, Tex.). ♀, Cypress Mills, Tex. (Washington). ♀, Fedor, Tex., May 1 (Cambridge). ♂, ♀, Lee County, Tex., Oct. and Oct. 1910 (Cambridge). ♀, Longpoint, Tex. (Cambridge). ♀, Noack, Williamson County, Tex., May 29, 1944, J. E Gillaspy (Townes). ♂, Shiloh, Tex., Oct. 8, 1935, J. E. Gillaspy (College Station, Tex.). ♀, Victoria, Tex., May 1905, A. McLaughlin (Washington). ♀, Victoria, Tex., Nov. 8, 1904, J. C. Crawford (Washington). ♀, Victoria, Tex., Dec. 19, 1910, J. D. Mitchell (Washington). ♂, 3♀, Texas, Belfrage (Washington). ♂, Texas (Cambridge). ♀, June 24, 1931 (Parks). ♀, no data (Washington).

This species is restricted to Texas.

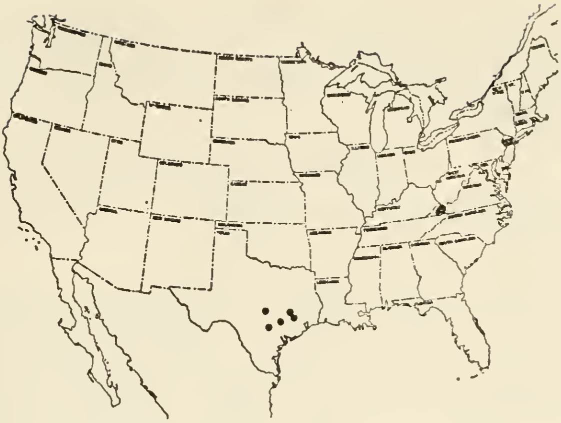


FIGURE 8.—Localities for *Chirodamus feroculis.*

7. *Chirodamus feroculis* (Banks)

Pseudagenia feroculis Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 232, ♂. Type: ♂, Coryell County, Tex. (Cambridge).

MALE: Forewing 10.5 to 14 mm. long; basal tooth of outer claw of fore tarsus about 0.7 as long as the part of the claw beyond it, the two parts widely separated basally and strongly convergent apically; mesopleuron subshining, with close fine punctures and with larger punctures that are separated by about 3.0 their diameter, abdomen with a rather weak constriction between the first and second tergites; apical margin of fifth sternite gently concave.

Black. Inner orbit with a yellowish stripe; wings black.

FEMALE: Forewing 12 to 16 mm. long; second flagellar segment about 1.65 as long as wide; propodeum smooth; larger punctures on sternites weak and very sparse.

Black. Wings black; second tergite brownish red except on its apical margin; first tergite more or less distinctly brownish red except basally and apically.

The female of this species is very similar to that of *validus*, appearing only subspecifically distinct; however, the males of the two species, if properly associated, are quite different in structure as well as in color.

SPECIMENS: ♀, Pennington Gap, Va. (Washington). ♀, Stone Creek, Lee County, Va. (Cambridge). ♀, Virginia (Cambridge). ♂, Bastrop County, Tex. (Townes). ♂, Brazos County, Tex., Apr. 16, 1938, J. E. Gillaspy (College Station, Tex.). 4♂, College Station, Tex., Apr. 29, 1937, May 2 and 9, 1937, R. W. Strandtmann (Strandtmann and Townes). ♂, Coryell County, Tex., May (Cambridge). ♀, Gunsight, Tex., Apr. 21, 1935 (Townes). 3♂, Willis, Tex., May 1903, Bridwell (Washington). 2♂, 4♀, Texas, Belfrage (Washington).

This species is known from Virginia and Texas. Adults have been collected in April and May.

8. *Chirodamus validus* (Cresson)

Pompilus (*Priocnemis*) *validus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 116, ♀. Type: ♀, Georgia (Philadelphia).

Male: Forewing 11.5 mm. long; tooth on outer claw of fore tarsus about 0.7 as long as the part of the claw beyond it, the two parts widely separated basally, convergent apically; mesopleuron shining, with rather close fine punctures and with distinct coarse punctures that are separated by about 3.0 their diameter; propodeum with numerous coarse punctures that are separated by about 1.0 their diameter (these punctures weaker and sparser in the other species of the genus); apical margin of fifth sternite gently concave.

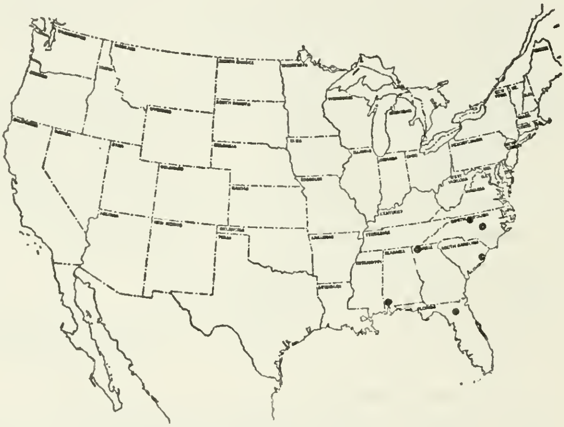


Figure 9.—Localities for *Chirodamus validus*.

Black. Inner orbit with a yellowish stripe; wings black; tarsi, tibiae, and apical 0.4± of femora fulvous; wings black; abdomen brownish red.

Female: Forewing about 13 mm. long; second flagellar segment about 1.8 as long as wide; propodeum smooth; larger punctures on sternites weak and very sparse.

Black. Wings black; abdomen brownish red, the apical margin of the sclerites a little darker, or (in the type and in the South Carolina specimen) much darker and the abdomen beyond the third segment mostly blackish.

Specimens: ♂, Mobile, Ala., Apr. 21, G. P. Engelhardt (Washington). ♀, Gainesville, Fla., May 1921, G. P. Engelhardt (Washington). ♀, Head River, Ga., July 24, 1936, P. W. Fattig (Cambridge). ♀, Head River, Ga., Aug. 2, 1936, H. G. Forester (Townes). 2♀, Spring Creek, Ga., May 18 to 21, 1916, J. C. Bradley (Ithaca and Cambridge). ♀, Raleigh, N. C., June 5, 1923, T. B. Mitchell (Raleigh). ♀, Raleigh, N. C., July 12, 1935, C. S. Brimley (Raleigh). ♀, Wilkes County, N. C., July 23, 1934, F. Perlmutter (Raleigh). ♀, McClellanville, S. C., May 14, 1944, H. and M. Townes (Townes).

This species has been collected from North Carolina to Florida.

Genus *Pepsis* Fabricius

Pepsis Fabricius, 1804, Systema piezatorum . . . , p. 207. Type: *Pepsis ruficornis* Fabricius; designated by Ashmead, 1900.

Brethesia Schrottky, 1909, Anales Soc. Cient. Argentina, vol. 68, p. 243. Type: *Pepsis dimidiata* Fabricius; original designation.

Gigantopepsis Lucas, 1919, Arch. Naturg., Abt. A, vol. 83 (5), pp. 10, 41. Type: *Pepsis gigantea* Lucas; original designation.

Nannopepsis Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 82. Type: *Pepsis pruinosa* Lucas; original designation.

Cirripepsis Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 82. Type: *Pepsis planifrons* Lucas; original designation.

Trichopepsis Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 82. Type: *Pepsis limbata* Guérin; original designation.

Stenopepsis Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 82. Type: *Pepsis hymenaea* Mocsáry; original designation.

Dinopepsis Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 83. Type: *Pepsis grossa* Fabricius; original designation.

Deropepsis Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 336. Type: (*Pepsis frivaldszkyi* "Erichson") = *frivaldszkyi* Mocsáry; original designation.

Large or very large species of average stoutness, the Nearctic species with the forewing 13 to 48 mm. long; clypeus rather large, often long; maxilla anthophilous; pronotum rather short, its hind margin arcuate; apical end of marginal cell separated from costal margin of wing, the cell rounded apically (the apex of this cell is adjacent to the wing tip and pointed or subtruncate in the other Nearctic Pepsinae); second intercubital vein moderately curved or sinuate; second recurrent vein reaching the second cubital cell near its basal 0.2; cubital vein reaching the wing margin; base of first discoidal cell containing a moderately distinct subcircular irregularity in the membrane; nervulus beyond the basal vein by about 0.35 its length; nervellus ending far beyond the juncture of cubitella with discoidella; anal lobe about 0.8 as long as submediella (pl. 1, fig. 2); hind tibia with a strong dorsal serration; brush on inner side of hind tibia broad, without a subapical constriction; last tarsal segment with two regular rows of bristles beneath; tooth on tarsal claws subbasal, pointed.

Pepsis is restricted to the Western Hemisphere, where it is represented by several hundred species in the Neotropics and fourteen species in the southern parts of the United States. Many of these fourteen are widely distributed south of our border and reach their northern limits in the extreme south of the United States. All are large or very large species which provision their nests with mygalomorph spiders ("tarantulas").

Dr. P. D. Hurd has recently published a monograph of the Nearctic species of *Pepsis*. His keys, synonymy, and distributional conclusions are given in a synoptic adapted fashion here for the sake of a complete record of the Nearctic Pepsinae. For more information on taxonomy, biology, and bibliography, or for clarification where the treatment below proves inadequate, consult Hurd's monograph (1952, Bull. Amer. Mus. Nat. Hist., vol. 98, pp. 261–334) or his earlier revision of the California species (1948, Univ. California, Publ. Ent., vol. 8, pp. 123–150).

Keys to the Nearctic species of Pepsis

MALES

1. Antenna 12-segmented; subgenital plate in the form of an elongate trapezoid, narrowing posteriorly, densely clothed with very long, erect, bristlelike hairs. SUBSPECIES OF FORMOSA 2
   Antenna 13-segmented; subgenital plate not in the form of an elongate trapezoid, glabrous or with fine, short pubescence 3
2. Wings mostly orange . . . . 1a. **formosa formosa** (Say)
   Wings mostly blackish . . . . 1b. **formosa pattoni** Banks
3. Fourth sternite and sometimes the fifth with dense groups of bristles or hairs forming brushes; subgenital plate more or less spatulate, without transverse, longitudinal, or toothlike processes on its ventral surface 4
   Fourth and fifth sternites without dense groups of bristles or hairs; subgenital plate various, but always with transverse, longitudinal, or toothlike processes on its ventral surface 9
4. Bristles on fourth sternite strongly reflexed near their apices 5
   Bristles on fourth sternite not strongly reflexed near their apices 7
5. Antennal sensoria large, basal and apical on the segments, most frequently in the form of opposing isosceles triangles or of a constricted band; wings entirely blackish . . . . 2. **saphirus** Palisot
   Antennal sensoria small, basal (rarely apical) on the segments, triangular or hemielliptical, impressed, markedly differentiated from the surrounding integument; wings mostly orange 6
6. Fourth and fifth sternites each with dense bristles or hairs; flagellum with at least the apical segment and frequently several or all segments orange. 3. **mildei** Stål
   Fourth sternite with dense bristles or hairs, the fifth sternite with a few scattered hairs; flagellum entirely blackish . . 4. **angustimarginata** Viereck
7. Fourth sternite with a pair of obliquely arranged rows of backward directed bristles, which when seen from below have a semicircular outline anteriorly, fifth sternite nearly or quite glabrous. SUBSPECIES OF ELEGANS . . . 8
   Fourth and fifth sternites each with dense, erect bristles or hairs forming brushes which in side view are longest anteriorly . . 5. **azteca** Cameron
8. Wings mostly orange, rarely blackish; flagellum black, brownish black, or rarely orange; range—Kansas and central Texas to Arizona and northern México . . . . 6a. **elegans cerberus** Lucas
   Wings entirely black; flagellum orange; range—Carolinian and Austroriparian faunas . . . . 6b. **elegans elegans** Lepeletier

9. Subgenital plate with a mediolongitudinal carina or a median basal carinate process, its apical margin without a transverse carinate process . . . 10

Subgenital plate without a mediolongitudinal carina or a median basal carinate process, its apical margin with a transverse carinate process 13

10. Subgenital plate strongly decurved 11

Subgenital plate flat or nearly flat 12

11. Antennal sensoria small, hemielliptical, impressed, markedly different from the surrounding integument; wings mostly blackish . . . . 7. **venusta** Smith

Antennal sensoria broad, as longitudinal stripes; wings mostly orange. 8. **marginata** Palisot

12. Apical edge of subgenital plate deeply notched . . . . 9. **arizonica** Banks

Apical edge of subgenital plate semicircularly convex . . 10. **aquila** Lucas

13. Subgenital plate with an apical transverse carina and a low subapical transverse carina which extends to either side of a subapical median tooth. 11. **thisbe** Lucas

Subgenital plate with apical and subapical transverse carinae but without a median tooth 14

14. Subapical carina of subgenital plate much shorter than width of subgenital plate, ending far from the lateral edges, strongly arcuate or angulate . 16

Subapical carina of subgenital plate extending nearly to the lateral edges, not strongly arcuate or angulate. SUBSPECIES OF PALLIDOLIMBATA . . . 15

15. Wings lemon yellow to yellowish brown; iridescent pubescence of head, body, and legs with a greenish sheen. 12a. **pallidolimbata pallidolimbata** Lucas

Wings fiery red to reddish brown; iridescent pubescence of head, body, and legs with a dark blue-green sheen . . . . 12b. **pallidolimbata smithi** Hurd

16. Subapical transverse carina of subgenital plate with a strong median angulation; wings mostly blackish . . . . 13. **mexicana** Lucas

Subapical transverse carina of subgenital plate evenly arcuate; wings mostly orange. SUBSPECIES OF CHRYSOTHEMIS 17

17. Width of subapical dark band on forewing considerably less than the length of the first plus the second flagellar segments. 14a. **chrysothemis chrysothemis** Lucas

Width of subapical dark band on forewing greater than the length of the first plus the second flagellar segments . . . . 14b. **chrysothemis lucasii** Fox

FEMALES

1. Front femur beneath with very long, bristlelike hairs. 2

Front femur beneath at most with a few short hairs 4

2. Middle and hind femora with very long, bristlelike hairs; middle and hind tibiae each with an anterolateral and a posterolateral longitudinal groove extending nearly its length . . . . 9. **arizonica** Banks

Middle and hind femora glabrous or nearly so; middle and hind tibiae without longitudinal grooves. SUBSPECIES OF FORMOSA 3

3. Wings mostly orange . . . . 1a. **formosa formosa** (Say)

Wings mostly blackish . . . . 1b. **formosa pattoni** Banks

4. Spurs of middle tibia conspicuously curved near the apex. SUBSPECIES OF ELEGANS 5

Spurs of middle tibia straight or only slightly curved. 6

5. Hind tibia dorsally with very long, apically curved bristles on its entire length; wings mostly orange; flagellum black, brownish black, or rarely orange . . . . 6a. **elegans cerberus** Lucas

Hind tibia dorsally with very long, apically curved bristles on only its basal third; wings entirely black; flagellum orange. 6b. **elegans elegans** Lepeletier

6. First flagellar segment much longer than the interocular distance at the level of the hind ocelli . . . . 5. **azteca** Cameron
First flagellar segment equal to or shorter than the interocular distance at the level of the hind ocelli 7
7. Wings mostly orange. 8
Wings mostly or entirely blackish 15
8. Apex of forewing entirely dark; occipital carina not reaching the hypostomal carina 9
Apex of forewing whitish hyaline, or at least much paler than the subapical dark band (when this is present); occipital carina reaching the hypostomal carina 13
9. Posterolateral continuation of transverse groove on second sternite lacking or only faintly indicated; inner spur of hind tibia about as long as the outer spur . . . . 8. **marginata** Palisot
Posterolateral continuation of transverse groove on second sternite present and deeply incised; inner spur of hind tibia much longer than the outer spur 10
10. Flagellum with at least the tip of the apical segment orange, frequently several or all of its segments orange . . . . 3. **mildei** Stål
Flagellum entirely blackish 11
11. Hind femur above with erect and recumbent bristlelike hairs, these most noticeable distally; apical dark band on forewing narrow, occupying less than half of the distance from the wing tip to the third intercubital vein . . . . 4. **angustimarginata** Viereck
Hind femur with at most a few scattered bristlelike hairs; apical dark band on forewing broad, occupying at least half the distance from the wing tip to the third intercubital vein. SUBSPECIES OF CHRYSOTHEMIS 12
12. Wings bright fiery red . . . . . . 14a. **chrysothemis chrysothemis** Lucas
Wings brownish yellow to fulvous red . . . 14b. **chrysothemis lucasii** Fox
13. Mesopleural tubercle weak, scarcely evident; forewing with a well defined subapical dark band which pales marginally to almost whitish hyaline. 11. **thisbe** Lucas
Mesopleural tubercle strong, elevated to form a blunt tooth; forewing without or with only an indistinct subapical dark band. SUBSPECIES OF PALLIDOLIMBATA 14
14. Wings lemon yellow to yellowish brown. 12a. **pallidolimbata pallidolimbata** Lucas
Wings fiery red to reddish brown . . . . 12b. **pallidolimbata smithi** Hurd
15. Flagellum blackish; apices of wings whitish hyaline . . 13. **mexicana** Lucas
Flagellum orange; wings entirely dark . . . . 2. **saphirus** Palisot

1. *Pepsis formosa* (Say)

There are two subspecies, with ranges as noted under each.

1a. *Pepsis formosa formosa* (Say)

Pompilus formosus Say, 1823, Western Quarterly Reporter of Medical, Surgical, and Natural Science, vol. 2, p. 76 (reference not seen; Leconte edition, vol. 1, pp. 91, 165), ♀. Type: ♀, Arkansas River within 100 miles of Rocky Mts. (destroyed).

Pepsis nephele Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 739, ♀. Type: ♀, Texas (Budapest).

Pepsis pseudoformosa Cockerell, 1898, Proc. Davenport Acad. Nat. Sci., vol. 7, p. 146, ♂. Types: ♂♂, Texas; Dallas, Tex., and mountainous region, Durango, México ("Mus. Berol.").

This subspecies ranges from northwestern México northward into Kansas and westward into northeastern Arizona and southern Nevada. It intergrades with the subspecies *pattoni* in central and eastern Arizona.

1b. *Pepsis formosa pattoni* Banks

Pepsis pattoni Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 181, ♂, ♀. Type: ♀, Palmerlee, Ariz. (Cambridge).

This subspecies ranges from western México (including Baja California) into southern California and southwestern Arizona.

2. *Pepsis saphirus* Palisot

Pepsis saphirus Palisot, 1806, Insects recueillis en Afrique et en Amérique, . . . , p. 39; pl. 1, fig. 4, ♀. Type: ♀, "Saint Domingue" (location unknown).

This species occurs in the West Indies and in southern Florida.

3. *Pepsis mildei* Stål

Pepsis mildei Stål, 1857, Öfvers. Svenska Vet.-Akad. Förh., vol. 14, p. 64 [sex ?]. Type: California (? Stockholm).

Pepsis hesperiae Patton, 1894, Proc. Ent. Soc. Washington, vol. 3, p. 46, ♂. Type: ♂, Poway, San Diego County, Calif. (location unknown).

Pepsis Boguei Fox, 1898, Proc. Ent. Soc. Washington, vol. 4, p. 146, ♂, ♀. Lectotype: ♀, locality unknown (Philadelphia).

This species occurs in southwestern United States and in northern México.

4. *Pepsis angustimarginata* Viereck

Pepsis angustimarginata Viereck, 1908, Trans. Amer. Ent. Soc., vol. 33, p. 398, ♀. Type: ♀, Oak Creek Canyon, 20 miles southwest of Flagstaff, Ariz. (Lawrence).

This species ranges from western Arkansas and western Texas to Utah and southeastern California and northwestern México.

5. *Pepsis azteca* Cameron

Pepsis azteca Cameron, 1893, Biologia Centrali-Americana, Hymenoptera, vol. 2, p. 215, ♀. Type: ♀, Atoyac, Vera Cruz, México (? London).

This species ranges from Panamá to south-central Texas.

6. *Pepsis elegans* Lepeletier

There are two subspecies, which together cover most of the Austral Region of the United States and northern México.

6a. *Pepsis elegans cerberus* Lucas

Pepsis cerberus Lucas, 1895, Berliner Ent. Zeitschr. vol. 39, p. 790, ♂. Lectotype: ♂, Texas (Budapest).

Pepsis inermis Fox, 1898, Proc. Ent. Soc. Washington, vol. 4, pp. 141, 146, ♀. Lectotype: ♀, Texas (Philadelphia).

This subspecies ranges from Kansas and central Texas to Arizona and northern México. It intergrades with the subspecies *elegans* in east-central Texas.

6b. *Pepsis elegans elegans* Lepeletier

Pepsis elegans Lepeletier, 1845, Histoire naturelle des insectes, hyménoptères, vol. 3, p. 489, ♂. Type: ♂, Pennsylvania (? Paris).

Pepsis dubitata Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 144, ♂, ♀. Lectotype: ♀, Georgia (Philadelphia).

This subspecies occurs in the Carolinian and Austroriparian faunas.

7. *Pepsis venusta* Smith

Pepsis venusta Smith, 1855, Catalogue of the hymenopterous insects in the British Museum, vol. 3, p. 196, ♂. Type: ♂, Tabajos, Brazil (London).

This species occurs from Brazil to southern Arizona. The female is unknown.

8. *Pepsis marginata* Palisot

Pepsis marginata Palisot, 1809, Insects recueillis en Afrique et en Amérique, . . . , p. 94, pl. 2, figs. 2, 3, ♂, ♀. Types: ♂, ♀, "Saint Domingue" (location unknown).

Pepsis heros Dahlbom, 1844, Hymenoptera Europaea . . . , vol. 1, p. 122, ♀. Type: ♀, Santo Domingo (?Lund).

This species occurs in the West Indies and southern Florida.

9. *Pepsis arizonica* Banks

Pepsis arizonica Banks, 1921. Ann. Ent. Soc. Amer., vol. 14, pp. 21–22, 23, ♂. Type: ♂, Huachuca Mts. (Cambridge).

Pepsis hirsuta Salman, 1933, Pan-Pacific Ent. vol. 9, p. 9, ♀. Type: ♀, southern Arizona (Cambridge).

This species occurs in north-central México, western Texas, southern Arizona, and southeastern California.

10. *Pepsis aquila* Lucas

Pepsis aquila Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 797, ♂. Type: ♂, México (Budapest).

This species occurs in north-central México and in southern Arizona and New Mexico. The female is unknown.

11. *Pepsis thisbe* Lucas

PLATE 1, FIGURE 2

Pepsis thisbe Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 744, ♂, ♀. Types: ♂, ♀, Cuernavaca and mountainous region of Durango in México ("Mus. caes. Vindob." and "Mus. Berol.").

Pepsis sayi Banks, 1926, Canadian Ent., vol. 58, p. 202, ♂ (♀ misdetermined). Lectotype: ♂, San Emigdo Canyon, Kern County, Calif. (Cambridge).

Pepsis sherillae Hurd, 1948, Univ. California Pub. Ent., vol. 8, p. 146, ♂. Type: ♂, 8 miles west of Needles, Calif. (Riverside).

This is a common species in the Upper and Lower Sonoran faunas.

12. *Pepsis pallidolimbata* Lucas

There are two subspecies, which together range through the southwestern United States and northern México.

12a. *Pepsis pallidolimbata pallidolimbata* Lucas

Pepsis pallidolimbata Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 745, ♀ Type: ♀, northwest America ("Mus. caes. Vindob.").

Pepsis bequaerti Salman, 1928, Pan-Pacific Ent., vol. 5, p. 23, ♂. Type: ♂, Valentine, Tex. (Cambridge).

This subspecies occurs in most of the Upper and Lower Sonoran faunas. It is replaced in central California by the subspecies *smithi*.

12b. *Pepsis pallidolimbata smithi* Hurd

Pepsis pallidolimbata smithi Hurd, 1948. Univ. California Pub. Ent., vol. 8, p. 142, ♂, ♀. Type: ♂, Corral Hollow, Alameda County, Calif. (San Francisco).

This subspecies occurs in the San Joaquin Valley of central California and in the adjacent foothills.

13. *Pepsis mexicana* Lucas

Pepsis mexicana Lucas, 1895, Berliner Ent. Zeitschr., vol. 36, p. 566, ♂, ♀. Types: ♂, ♀. México and Cuernavaca in México ("Mus. caes. Vindob." and "Mus. Berol.").

This species occurs from southwestern Texas and southern Arizona, New Mexico, and California southward to Colombia.

14. *Pepsis chrysothemis* Lucas

There are two subspecies, which together occur from Texas to the Pacific Coast and in northern México.

14a. *Pepsis chrysothemis chrysothemis* Lucas

Pepsis chrysothemis Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 739, ♂. Types: ♂♂, México and Texas ("Mus. Berol." and "Mus. caes. Vindob.")

Pepsis cinnabarina Lucas, 1895, Berliner Ent. Zeitschr., vol. 39, p. 804, ♀. Types: ♀♀, México and Coulterville, Calif. ("Mus. Berol.", "Mus. caes. Vindob.", and "Mus. Brem.").

This subspecies occurs from the Big Bend part of Texas to the vicinity of San Francisco, and southward to northern México.

14b. *Pepsis chrysothemis lucasii* Fox

Pepsis Lucasii Fox, 1898, Proc. Ent. Soc. Washington, vol. 4, p. 145, ♀. Type: ♀, Texas (Philadelphia).

This subspecies occurs in the eastern half of Texas and in northeastern México.

Genus *Hemipepsis* Dahlbom

Hemipepsis Dahlbom, 1844, Hymenoptera Europaea, . . ., vol. 1, p. 123. Type: *Hemipepsis capensis* Dahlbom; designated by Ashmead, 1900.

Pallosoma Lepeletier, 1845, Histoire naturelle des insects hyménoptères, vol. 3, p. 492. Type: *Pallosoma barbara* Lepeletier; designated by Ashmead, 1900.

Tetraodontonyx Ashmead, 1900, Canadian Ent., vol. 32, p. 187. Type: (*Tetraodontonyx rufipes* Ashmead) = *heros* Guérin; original designation.

Tetracryptocheilus Zavattari, 1907, Bol. Mus. Zool. ed Anat. Comp. Univ. Torino, vol. 22, No. 555, p. 4. Type: *Cryptocheilus* (*Tetracryptocheilus*) *ascensi* Zavattari; original designation.

Tetracryptochilus Schulz, 1911, Zoologische Annalen, vol. 4, p. 112. Emendation.

Trichonyx Haupt, 1929, Rev. Zool. Bot. Africaines, vol. 17, p. 195. Type: *Hemipepsis unguicularis* Kohl; original designation.

Pachynimia Haupt, 1929, Rev. Zool. Bot. Africaines, vol. 17, pp. 197, 202. Type: *Priocnemis tinctor* Saussure; original designation.

Xenopepsis Arnold, 1932, Ann. Transvaal Mus., vol. 14, pp. 291, 323, 367. Type: *Hemipepsis* (*Xenopepsis*) *commixta* Arnold; original designation.

Moropepsis Banks, 1934, Proc. Amer. Acad. Arts Sci., vol. 69, pp. 6, 8. Type: *Hemipepsis* (*Moropepsis*) *croesus* Banks; monobasic.

Hovagenia Banks, 1941, Proc. Acad. Nat. Sci. Philadelphia, vol. 92, p. 343. Type: *Hovagenia saussurei* Banks; original designation.

Large or very large species of average stoutness, the Nearctic species with the forewing 11 to 27 mm. long; clypeus moderately large; pronotum moderately long, its hind margin arcuate; second intercubital vein somewhat curved; second recurrent vein reaching second cubital cell near its apical 0.1; cubital vein reaching the wing margin; base of first discoidal cell containing a conspicuous subcircular irregularity in the membrane; nervulus beyond basal vein by 0.2 to 0.4 its length; nervellus ending beyond juncture of cubitella with discoidella; anal lobe about 0.9 as long as submediella (pl. 1, fig. 3); hind tibia with a dorsal serration or rippled carina; brush on inner side of hind tibia rather broad, without a subapical constriction; last tarsal segment with two regular rows of bristles beneath; tarsal claws ordinarily with two to four erect acute teeth beneath, the basal ones often difficult to observe (the claws are reported as "bifid" in the Ethiopian *Hemipepsis commixta*); empodium large, about 0.75 as wide as apical width of last tarsal segment, with a regular apical fringe of about 14 to 40 setae (in all other Pepsinae the empodium is slender, about 0.5 as wide as apical width of last tarsal segment, and with a sparser, less regular fringe of about 8 setae).

This genus includes many large, strikingly colored species of the Old World Tropics. In the New World it is replaced largely by the genus *Pepsis* and is represented there by only a few species in Central America and México, of which three reach the southwestern United States. Some of the names indicated in the generic synonymy are used for subgenera by Arnold (1932, p. 291) and by Banks (1934, loc. cit.). I have not tried to test their conclusions on the use of subgenera, and for the present refer all of our Nearctic species to a *Hemipepsis* without subgeneric divisions.

Keys to the Nearctic species of Hemipepsis

MALES

1. Wings light brownish fuscous; flagellum orange apically, blackish basally.
3. **mexicana** (Cresson)

Wings mostly orange, fuscous at the base and apex; flagellum blackish . . . 2

2. Nervellus beyond the cubitella by 0.2 to 0.35 the average width of the submedian cell; suberect hair on clypeus and face averaging about 0.6 as long as the median length of the clypeus . . . . 1. **toussainti** (Banks)

Nervellus beyond the cubitella by about 0.6 the average width of the submedian cell; suberect hair on clypeus and face averaging about 0.4 as long as the median length of the clypeus. SUBSPECIES OF USTULATA 3

3. Base of forewing infuscate for a distance equal to 0.5 or more the length of the anal lobe; base of hind wing infuscate for a distance equal to 0.8 or more the length of the anal lobe; forewing averaging about 20 mm. long.
2a. **ustulata ustulata** Dahlbom

Base of forewing infuscate for a distance equal to about 0.3 the length of the anal lobe; base of hind wing infuscate for a distance equal to about 0.4 the length of the anal lobe, the lobe itself usually mostly fuscous; forewing averaging about 17 mm. long . . . . 2b. **ustulata ochroptera** Stål.

FEMALES

1. Flagellum beyond first segment orange 2

Flagellum beyond first segment blackish. SUBSPECIES OF USTULATA 3

2. Lateral ocellus separated from the eye by about 1.0 its diameter; clypeus with a subapical row of about 4 to 8 long suberect hairs, above which are a few shorter suberect hairs that are less than a third as long as the subapical row; long suberect hairs of head and thorax sparse; dorsal longitudinal carina on hind tibia with only a weak ripple to indicate rudimentary teeth.
3. **mexicana** (Cresson)

Lateral ocellus separated from the eye by about 3.5 its diameter; clypeus with a subapical row of about 4 to 8 long suberect hairs, above which are many shorter suberect hairs which are more than half as long as the subapical row; long suberect hairs of head and thorax abundant; dorsal longitudinal carina on hind tibia subserrate . . . . 1. **toussainti** (Banks)

3. Base of forewing infuscate for a distance equal to 0.5 or more the length of the anal lobe; base of hind wing infuscate for a distance equal to 0.6 or more the length of the anal lobe; forewing averaging about 23 mm. long.
2a. **ustulata ustulata** Dahlbom

Base of forewing infuscate for a distance equal to 0.4 or less the length of the anal lobe; base of hind wing infuscate for a distance equal to 0.3 or less the length of the anal lobe, the anal lobe itself mostly or entirely infuscate (pl. 1, fig. 3); forewing averaging about 21 mm. long.
2b. **ustulata ochroptera** Stål.

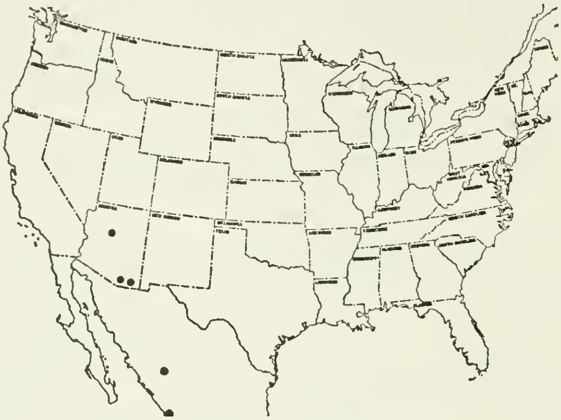


FIGURE 10.—Localities for *Hemipepsis toussainti.*

1. *Hemipepsis toussainti* (Banks)

Mygnimia toussainti Banks, 1928, Studies on Cuban insects (Harvard Univ. Press), vol. 1, p. 5, ♂. Type: ♂, Port au Prince, Haiti (Cambridge).

Forewing 17 to 20 mm. long in the male, 23 to 27 mm. long in the female; long suberect hair on basal part of male clypeus about 0.6 as long as the apical width of the clypeus; nervellus beyond the cubitella by 0.2 to 0.35 the average width of the submediellan cell; median ventral row of bristles on last segment of female tarsi restricted to its basal 0.5 to 0.65. Otherwise structurally similar to *H. ustulata.*

Colored as in *H. ustulata ustulata* except that in the male the basal and apical infuscation of the wings is a little broader and that in the female the flagellum is orange, with the basal 0.4± of its first segment infuscate, the mesoscutum has only a very small amount of greenish blue iridescence visible at some angles, and the apical part of the forewing is a little less abruptly infuscate. The male flagellum is sometimes tinged with orange beneath.

Specimens: ♀, Carr Canyon, Huachuca Mts. at 7,500 ft., Ariz., July 29, 1948, H. E. Evans (Evans). ♀, Cave Creek, 9,800 ft., Chiricahua Mts., Ariz., July 1927, J. A. Kusche (Berkeley). ♀, 20 miles west of Flagstaff, Ariz., Oct. 4, 1904 (Washington). ♀, near Grafton, N. Mex., 1863, J. B. Adams (Washington). ♀, Amecameca, México, June 30, 1897, O. W. Barrett (Washington). ♂, Distrito Federal, México, L. Conradi (Washington). ♂, near Mexico City, July 1897, O. W. Barrett (Washington). ♀, Tlalpam (near Mexico City), México, July 2, 1942, W. F. Foshag (Washington). ♀, 5 miles east of Coyotes, Durango, México, Aug. 4, 1951, H. E. Evans (Berkeley and Evans). 2 ♀, west slope of Popocatépetl at 9,600 ft., México, July 5, 1951, H. E. Evans (Evans). ♂, 5 ♀, 5 miles west of Zacapu, Michoacán, México, July 13, 1951, P. D. Hurd and H. E. Evans (Berkeley and Evans). ♂ (type), Port au Prince, Haiti, W. M. Mann (Cambridge).

This species occurs in Arizona, New Mexico, México, and Haiti.

2. *Hemipepsis ustulata* Dahlbom

Forewing 11 to 25 mm. long in the male, 14 to 27 mm. long in the female; lateral ocellus separated from the eye by about 3.5 its diameter; head and thorax with numerous long suberect hairs, especially dense in the male; clypeus of male with dense long suberect hair, that on its basal part about 0.4 as long as the apical width of the clypeus; clypeus of female with a subapical row of about 4 to 8 long suberect hairs, above which are many shorter suberect hairs which are more than half as long as the subapical row; nervellus joining the mediella beyond the cubitella by about 0.7 the average width of the submediellan cell; under side of last segment of female tarsi basally with a median row of bristles that extends not more than 0.4 the length of the segment, or the bristle row incomplete or absent; external longitudinal carina of female hind tibia scalloped into a row of acute teeth.

Black, with black pubescence, hair, and bristles. Female mesoscutum, when viewed from the front, with a little bluish iridescence; wings orange, their apical margins and the hind margin of the hind wing infuscate, their bases more or less infuscate according to the subspecies.

This species is represented by two subspecies—*ustulata*, a widespread form, and *ochroptera* restricted almost entirely to California.

2a. *Hemipepsis ustulata ustulata* Dahlbom

Hemipepsis ustulata Dahlbom, 1843, Hymenoptera Europaea, vol. 1, p. 123, ♀. Type: ♀, "Mexico" (Lund).

Mygnimia cressoni Banks, 1926, Canadian Ent., vol. 58, p. 203, [♂, ♀]. Type: ♂, Fedor, Lee County, Tex. (Cambridge).

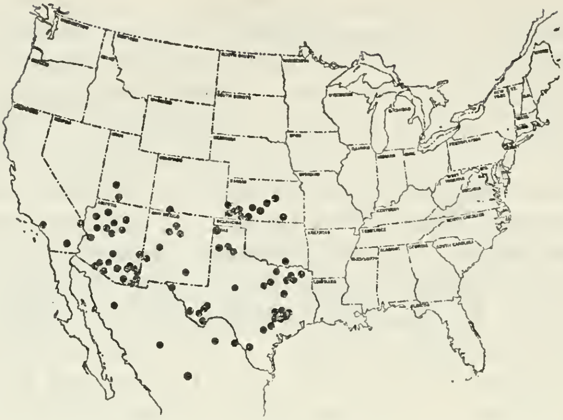


FIGURE 11.—Localities for *Hemipepsis ustulata ustulata.*

Forewing of male 15 to 25 mm. long, of female 17 to 27 mm. long. Blackish color at wing bases conspicuous, extending on the wing bases more than half the length of the anal lobe.

Banks proposed the name *cressoni* for this form because Dahlbom described his *ustulata* from "México" and mentioned a bluish coloration. The female of the present form does have some bluish iridescence, and it must be remembered that in 1842 much of what is now in the southwestern United States belonged to México. Miss Louise Russell has compared specimens from Texas with Dahlbom's type for me, and reports that they agree very well.

SPECIMENS (98♂, 112♀): From Arizona (Ajo, Alamo Canyon in the Ajo Mts., Ash Creek at 3,200 ft. in the Graham Mts., Bowie, Congress Junction, Cornville, Douglas, Flagstaff, Fort Grant, Ganado, Grand Canyon, Huachuca Mts., Hualpal Mt., base of Humphrey's Peak at 9,500 ft., Maricopa Mts., Navajo County, Oak Creek Canyon at 6,000 ft., Phoenix, Post Creek Canyon in the Pinaleno Mts., Sabino Canyon in the Santa Catalina Mts. at 4,000 ft., San Bernadino Ranch in Cochise County at 3,750 ft., Springerville at 7,000 ft., Tucson, and Williams); California (Compton, Los Angeles County, New York Mts., and Santa Rosa Mts.); Colorado (Arboles); Kansas (Chautauqua County, Clark County, Garden City, Grant County, Hamilton County, Manhattan, Marion County, Meade County, Morton County, and Seward County); Oklahoma (Ardmore); New Mexico (El Rito, Jemez Springs, Las Vegas Hot Springs, Luna at 7,300 ft., Magdalena Mts., and White Sands); Texas (Amarillo, Bastrop County, Brazos County, Burnet, Calvert, Cisco, Chinati Mt., Chisos Mts., College Station, Clarendon, Dallas, Dimmit County, Eastland County, El Paso, Fedor, near Fort Davis, Friona, Glenn Springs in Brewster County, Hunt County, Limpia Canyon in the Davis Mts. at 5,000 ft., Marfa, Maxwell, McKinney, Paris, Shiloh, Stanton, Waco, Wichita Falls, and Williamson County); Utah (Bear Valley, Bellevue, and Zion Park); and México (Distrito Federal, La Laguna in the Sierra Laguna of Baja California, Nuevo Laredo, Palos Colorados at 8,000 ft. in Durango, San Bartola Dam in Baja California, Zacapú in Michoacán, and Zimapán in Hidalgo).

Collection dates range from Apr. 1 at Douglas, Ariz., to Dec. 26 in Sabino Canyon, Santa Catalina Mts., Ariz. Relatively few of the collection dates fall after Oct. 5, and no males are on record after Oct. 14. Flower records comprise *Polytaenia nuttallii* and *Daucus carota*.

This is a conspicuous form in the southwestern United States (except California) and adjacent México, occurring abundantly in the Lower and Upper Sonoran faunal areas and commonly in the Transition. I have seen it in numbers in April in the Sonoran desert of Arizona, where the males often perch in the tops of the highest palo verde trees (*Cercidium microphyllum*) on the crests of the desert hills. For remarks on intergrading with the subspecies *ochroptera*, see under that form.

2b. *Hemipepsis ustulata ochroptera* Stål

PLATE 1, FIGURE 3

Hemipepsis ochroptera Stål, 1857, Öfvers. Svenska Vet.-Akad. Förh., vol. 14, p. 64. Type: California (lost).

Mygnimia hesperina Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 102, ♂, ♀. Type: ♀, Stanford University, Calif. (Cambridge).

Forewing of male 11 to 23 mm. long, of female 14 to 27 mm. long. Blackish color at wing bases not conspicuous, extending on the wing bases less than half the length of the anal lobe, though the lobe itself is largely or entirely infuscate.

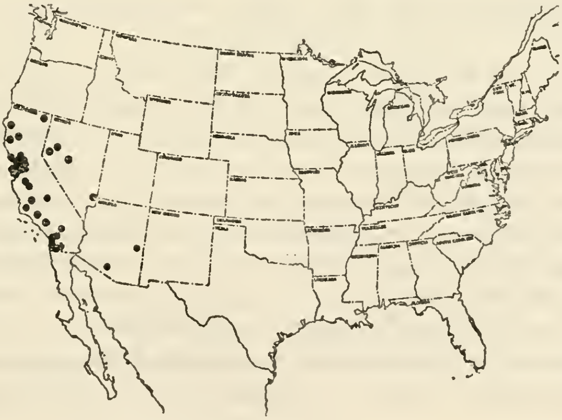


FIGURE 12.—Localities for *Hemipepsis ustulata ochroptera*.

Stål's description of his *ochroptera* is meager, but agrees with the present form perfectly and there are no other species of the genus in California. The possibility that he may have had a *Cryptocheilus* instead of a *Hemipepsis* has been considered but seems remote in view of the fact that the two other species of *Hemipepsis* that Stål described at the same time (the Ethiopian *iodoptera* and *ochropus*) are known to have been correctly placed.

Specimens (58♂, 66♀): From California (Antioch, Benicia, Benton Station in Modoc County, Berkeley, Brentwood, Byron, Camp Baldy in Los Angeles County, Coalinga, Colton, Concord, Davis, Escondido, Hastings Reserve in Monterey County, Humboldt County, Jamesburg, Menlo Park, Middleton, Mill Valley, Morgan Hill, Mountain View, Niles, Palm Desert in Riverside County, Redwood City, San Diego County, San Joaquin Experimental Range in Madera County, San Jose, San Rafael, Santa Paula, Sonoma County, Stanford University, and Telsa); and Nevada (Buffalo Valley in Lander County). Also, there are a few specimens somewhat intermediate to the subspecies *ustulata* from Arizona (Pima County and Springerville) and Nevada (Mesquite, Pyramid, and Reno).

Dates of collection are from Apr. 15 at Berkeley, Calif., to October at Mountain View, Calif. Most of them fall in the summer months.

This subspecies appears to be common in the Upper and Lower Sonoran faunas of middle and southern California. Specimens from southern California (San Diego, etc.) are somewhat intermediate to the subspecies *ustulata*, and additional more or less intermediate forms are on hand from Nevada, Utah, and northern Arizona. The Utah intermediates and most of those from northern Arizona are recorded under *ustulata ustulata*, as they seem to fit best there.

3. *Hemipepsis mexicana* (Cresson)

Mygnimia mexicana Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1., p. 143, ♀. Lectotype: ♀, Vera Cruz, Mexico (Philadelphia).

Forewing 11.5 to 18 mm. long in the male, 17 to 22 mm. long in the female; lateral ocellus separated from the eye by about 1.0 to 1.5 its diameter in the male, and by about 1.0 its diameter in the female; head and thorax with suberect hairs, moderately dense in the male and sparse in the female; clypeus of male with some suberect hair of moderate length; clypeus of female with a subapical row of 4 to 8 long suberect hairs, above which are a few shorter suberect hairs that are less than a third as long as the subapical row; nervellus joining the mediella only slightly beyond (about 1 to 2 times the width of the vein) the cubitella; under side of last segment of female tarsi with a median basal row of about 2 or 3 bristles, these all basad of the middle; external longitudinal carina of female hind tibia subentire, with only a weak ripple to indicate rudimentary teeth.

MALE: Blackish brown. Pubescence and hairs brown; face yellow or blackish brown with lateral yellow marks; clypeus yellow with a brown median mark or blackish brown marked with yellow laterally; labrum and part of mandible yellowish; antenna orange, but fuscous above, the fuscous fading out at the apical 0.65 to leave the apical part entirely orange; hind edge of pronotum with a yellowish stripe; wings yellowish brown; front tibia and tarsus, more or less of the front femur except basally, and often the middle tibia and tarsus yellowish brown.

FEMALE: Black. Pubescence and hairs dark brown; flagellum orange except for a basal section of its first segment; wings orange, the apical margin of the forewing a little infuscate.

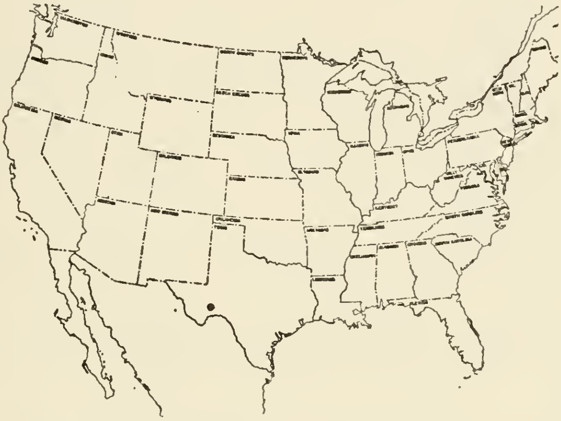


FIGURE 13.—Locality for *Hemipepsis mexicana.*

SPECIMENS: ♀, Phantom Lake, Davis Mts., Fort Davis Quadrangle, Tex., June 5, 1916, F. M. Gaige (Ann Arbor). 3 ♀, at light, Cairo, Costa Rica, Apr. 21, 1944, P. K. Knight (Washington and Lawrence). 4 ♀, San Carlos, Costa Rica, Schild and Burgdorf (Washington). ♂, Zarzero, Costa Rica, Schild and Burgdorf (Washington). ♀, Cayuga, Guatemala, Aug. 1915, W. Schaus (Washington). ♀, San Pedro Sula, Honduras, W. M. Mann (Washington). ♀, Vera Cruz, México, F. Mawcinitt (Washington). ♀ (type) Vera Cruz, México (Philadelphia). 10♂, Barro Colorado Island, Panamá, various dates from Apr. 15 to June 14, J. Zetek and S. W. Frost (Washington). 3 ♀, Barro Colorado Island, Panamá, May 23 to 24 and Sept. 5, J. Zetek (Washington). 3 ♀, Cabima, Panamá, May 21, 26, and 29, 1911, A. Busck (Washington). ♀, La Chorrera, Panamá, May 12, 1912, A. Busck (Washington).

This species occurs from Panamá to the Big Bend country of Texas. The collection of three females at light at Cairo, Costa Rica is of interest, as it is another case of a species with enlarged ocelli coming to lights at night.

Genus *Priocnessus* Banks

Priocnessus Banks, 1925. Bull. Mus. Comp. Zool., vol. 47, p. 337. Type: *Salius neotropicalis* Cameron; designated by Pate, 1946.

Cressochilus Banks, 1941. Canadian Ent., vol. 73, pp. 119, 120. Type: *Pompilus nuperus* Cresson; original designation.

Amerocnemis Banks, 1945. Bol. Ent. Venezolana, vol. 4, p. 93. Type: *Amerocnemis bequaerti* Banks; original designation.

Medium sized to moderately large species, of rather slender build, the forewing in Nearctic species 6.5 to 17 mm. long; clypeus very large, convex, in some males with a highly modified shape; pronotum short, its hind margin arcuate; second intercubital vein somewhat curved; second recurrent vein reaching second cubital cell at or just beyond its middle; cubital vein fading out before reaching the wing margin; base of first discoidal cell with a faint subcircular irregularity in its membrane; nervulus beyond the basal vein by 0.3 to 1.2 its length; nervellus ending at or beyond juncture of cubitella with discoidella; anal lobe about 0.7 to 0.8 as long as submediella (pl. 1, fig. 4); hind tibia with a strong dorsal serration; brush on inner side of hind tibia of moderate width, without a subapical constriction; last tarsal segment without or with a few preapical bristles beneath; tooth on tarsal claw of female erect and acute, that on tarsal claw of male usually more or less modified, sometimes in the form of a subbasal lobe.

Priocnessus is a typical case of a Neotropic genus with intrusions into the southern portions of the Nearctic region. No species are known from the Eastern Hemisphere. The described Neotropic species known to me are *Pompilus* (*Priocnemis*) *cincticornis* Cresson 1867, *Salius* (*Priocnemis*) *neotropicalis* Cameron 1891, *Priocnemella monticola* Banks 1938, *Priocnessus prominens* Banks 1945, *Amerocnemis bequaerti* Banks 1945, and *Priophanes ornata* Banks 1945. The last species has not previously been referred to *Priocnessus*. The genus is much larger in the Neotropics than this small number of described species might indicate. There are six Nearctic species.

Key to the Nearctic species of Priocnessus

1. Head and body rufous or mostly rufous **2**
   Head and body black **4**
2. Forewing subhyaline, with three brown cross-bands (pl. 2, fig. 16). 4. **apache** (Banks)
   Forewing uniformly dark brown **3**

3. Female without preapical bristles on the under side of the fifth tarsal segment. Male unknown . . . . 3. **coloradensis** (Banks)
   Female with 3 to 10 preapical bristles on the under side of the fifth tarsal segment. Male with numerous specializations which should permit easy distinction from those of *P. coloradensis* (see their description under the species). 6. **nuperus** (Cresson)
4. Wings orange . . . . 5. **nigricans**, new species
   Wings subhyaline to blackish 5
5. Flagellum black; male clypeus white or mostly white; inner orbit of female not tinged with orange . . . . 1. **nebulosus** (Dahlbom)
   Flagellum orange; male clypeus black; inner orbit of female tinged with orange . . . . 2. **dakota** (Cresson)

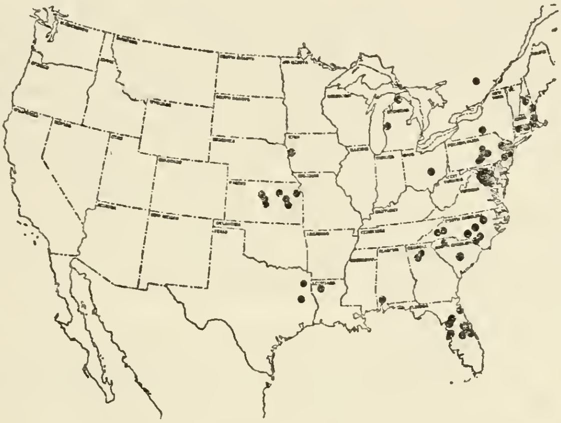


FIGURE 14.—Localities for *Priocnessus nebulosus*.

1. *Priocnessus nebulosus* (Dahlbom)

PLATE 1, FIGURE 4

Priocnemis nebulosus Dahlbom, 1843, Hymenoptera Europaea, vol. 1, p. 96. Type: ♀, South Carolina (Lund).

Pompilus (*Agenia*) *pulchrinus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 126. Lectotype: ♂, West Virginia (Philadelphia).

Priocnemis subconicus Rohwer, 1911, Proc. U. S. Nat. Mus., vol. 40, p. 556. Type: ♀, Lawrence, Kans. (Washington).

Priocnemis leibyi Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 203 (new synonymy). Type: ♂, Edgecombe County, N. C. (Raleigh).

MALE: Forewing 6.5 to 9.5 mm. long; clypeus rather weakly convex, its apical margin with a weak median tooth, its lateral margin with an impressed flange that is widest apically; flagellar segments without a longitudinal groove; middle and hind coxae not unusually enlarged; hind trochanter without an apical tubercle; subgenital plate tongue-shaped, its median longitudinal raised area a narrow ridge which is evanescent apically and somewhat higher, broadened, and flat-topped basally.

Black. Part of mandible, clypeus except for a median spot reaching its apex, face except at the middle, lower lateral part of frons, narrow hind orbit, front of front coxa, usually the knees narrowly, outside of front tibia, tibial spurs, usually most of first three tarsal segments except at their bases and apices, and most of seventh tergite, white; tegula brown; wings hyaline, their apices infuscate, the forewing with a more or less distinct, short postdiscal fascia centering just beyond the apex of the stigma.

A distinctive color variant has the black of the femora and tibiae replaced by fulvous, and often the black of the coxae (especially of the front coxa) stained or replaced by fulvous. The type of *Priocnemis leibyi* belongs to this variety. A female of corresponding color has not yet been collected. Another color variation, this one forming a geographic cline, involves the wing color. Male specimens from Florida have the wings, especially the apical half of the forewing, strongly infuscate. This Floridian tendency toward wing darkening is present in a diminishing degree in Lower Austral localities increasingly distant from Florida, being still evident in the Lower Austral Zone of North Carolina.

FEMALE: Forewing 9.5 to 14 mm. long; hind tibia with its dorsal teeth rather weak and the bristles in its dorsolateral row about 0.55 as long as the distance between their sockets; last segment of tarsi without preapical bristles beneath.

Black. Flagellum black; front orbit usually with narrow fulvous stain; wings blackish, the forewing with faintly darkened cross-bands at the apex, just beyond the apex of the stigma, and along the basal vein and nervulus; hind wing a little paler than the fore wing, darkened apically.

Females from the Lower Austral Zone tend to have the wings a little darker than females from the Upper Austral and Transition Zones.

SPECIMENS (55♂, 84♀): From Alabama (Spring Hill); Connecticut (Colebrook and East Hartford); District of Columbia; Florida (Brevard County, Buena Vista, Citrus County, Larkins, Ocala, Orange County, Orlando, St. Johns River, St. Nicholas, and Tarpon Springs); Georgia (Alma and Atlanta); Iowa (Sioux City); Kansas (Baldwin, Douglas County, Leavenworth County, Manhattan, Onaga, and Randolph); Louisiana (Shreveport); Maryland (Cabin John, Glen Echo, Mayo Beach, Plummers Island, and Takoma Park); Massachusetts (Boston and South Natick); Michigan (Cheboygan and Newaygo County); New Hampshire (Alton, Belknap County, and Pelham); New Jersey (Chatsworth, Fort Lee, and Moorestown); New

York (Ithaca); North Carolina (Blowing Rock, Crabtree Meadows at 3,600 ft. in Yancey County, and Wallace); Ohio (Hocking County); Ontario (Ottawa); Pennsylvania (Carlisle Junction, Highspire, Moosic, Mount Holly Springs, Overbrook, Roxborough, Pike County, and White Haven); South Carolina (Table Rock State Park); Texas (Rusk); and Virginia (Arlington, Falls Church, Great Falls, Rosslyn, Whiele, and Vienna).

The normal season of flight seems to be about July 1 to Sept. 10. Unusually early and late dates of collection are: Mar. 20 at Tarpon Springs, Fla.; Apr. 5 at Plummers Island, Md.; Apr. 6 at Ocala, Fla.; May 12 at Rusk, Tex.; May 16 in Orange County, Fla.; June 4 in Seminole County, Fla.; June 7 at Shreveport, La.; June 16 at Atlanta, Ga.; June 17 at Wallace, N. C.; June 22 at Washington, D. C.; June 23 at Takoma Park, Md.; July 7 at Moorestown, N. J.; Sept. 2 at North Fairhaven, N. Y.; Sept. 6 at East Hartford, Conn.; Sept. 9 at Blowing Rock, N. C.; Sept. 10 at Table Rock State Park, S. C.; Sept. 12 at Great Falls, Va.; Sept. 13 at Cabin John, Md.; Sept. 19 at Pelham, N. H.; and Oct. 1 at Manhattan, Kans. Both sexes have been taken at honeydew and there are three prey records—a female taken at Washington, D. C., July 10, 1947, by Richard Boettcher, transporting an immature *Agelenopsis*; a female taken at Overbrook, Pa., July 19, 1914, by G. M. Greene, transporting an *Agelenopsis naevia*; and a female taken at Manhattan, Kans., Aug. 28, 1949, by H. E. Evans, transporting a female *Agelenopsis pennsylvanica*.

The above records all apply to the typical color form. Males with fulvous legs (variety *leibyi*) have been taken as follows: 2♂, Atlanta, Ga., June 16 and 19, 1942, P. W. Fattig (Emory Univ. and Washington). ♂ (type), Edgecombe County, N. C., June 24, 1924, C. S. Brimley (Raleigh). ♂, Raleigh, N. C., May 1, 1935 (State College, Raleigh). ♂, Raleigh, N. C., June 16, 1927, C. S. Brimley (Raleigh). ♂, Southern Pines, N. C., June 19, 1949, H. and M. Townes (Townes). ♂, Wake County, N. C., July 1, 1951, H. and M. Townes (Townes). 5♂, Wallace, N. C., June 17, 1949, H. Townes (Townes and Dreisbach). ♂, Columbia, S. C., May 25, 1951, G. F. Townes (G. Townes). ♂, Morris, Tex., May 22, 1937 (Krombein). It should be noted that all of these males were collected earlier in the season than is normal for the typical form. With the five males from Wallace, N. C., three males of the typical form were collected on the same day and in the same habitat.

This species occurs in Ontario and in most of the eastern half of the United States. The normal flight range is about July 1 to Sept. 10, but it is on the wing commonly in May, and in Florida in April.

2. *Priocnessus dakota* (Cresson)

Pompilus (*Agenia*) *dakota* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 124, ♂. Type: ♂, "Dakota" (Philadelphia).

Pompilus (*Agenia*) *dakota pallidicornis* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 124, ♂ (preoccupied; new synonymy). Type: ♂, West Virginia (Philadelphia).

Priocnemis (*Priocnessus*) *kiowa* Banks, 1933, Psyche, vol. 40, p. 12. Type: ♀, Wathena, Kans. (Cambridge).

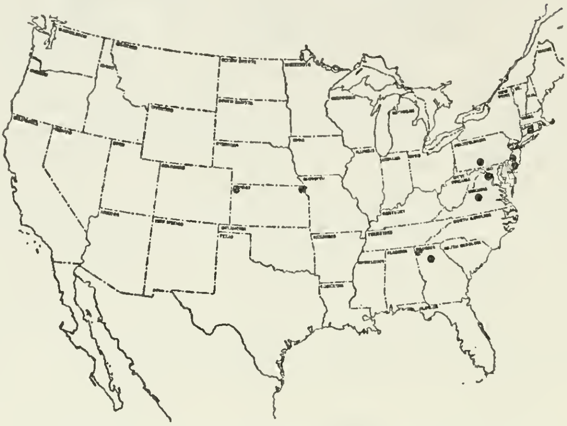


Figure 15.—Localities for *Priocnessus dakota.*

Male: Forewing 9.5 to 13 mm. long. Structure as described for the male of *P. nebulosus.*

Black. Clypeus, mandibles, and hind orbits faintly tinged with fulvous; front orbits and flagellum orange, the basal one or two and apical three or four segments partly infuscate; wings blackish.

Female: Forewing 12 to 15.5 mm. long; hind tibia with its dorsal teeth moderately strong and the bristles in its dorsolateral row about 0.6 as long as the distance between their sockets; last segment of tarsi without preapical bristles beneath.

Black. Flagellum orange, somewhat infuscate at the base and apex; wings black.

Specimens: 2♀, Lyme, Conn., July 8, and 22, 1918, W. S. Fisher (Washington). ♂ (type of *dakota*), Dakota (Philadelphia). 2♂, Atlanta, Ga., June 29 and July 6, 1936, P. W. Fattig (Emory Univ. and Cambridge). ♂, Head River, Ga., July 17, 1936, P. W. Fattig (Cambridge). ♂, Sittons Gulch, Ga., July 24, 1936, P. W. Fattig (Emory Univ.). ♀, Cheyenne County, Kans., F. X. Williams (Lawrence). ♀ (type of *kiowa*), Wathena, Kans., July 22, 1908, W. M. Mann (Washington). ♂, ♀, Cape May, N. J., July 8 and 9, 1937, W. Stone (Ithaca). ♂, Moorestown, N. J., June 30, 1939,

H. and M. Townes (Townes). ♂, Cruso, N. C., June 27, 1934 (State College, Raleigh). ♀, Mount Holly Springs, Pa., July 7, 1918, R. M. Fouts (Washington). ♂ (type of *pallidicornis*), W. Va. (Philadelphia). 2♂, Falls Church, Va., June 28 and July 4, N. Banks (Cambridge). ♀, on *Liriodendron* honeydew, Falls Church, Va., July 17, N. Banks (Cambridge). 2♀, Nelson County, Va., July 5, 1925, and Aug. 14, 1924, W. Robinson (Washington).

This species occurs over most of the eastern half of the United States but is uncommon. Adults have been taken from June 27 to Aug. 14.

3. *Priocnessus coloradensis* (Banks)

Cryptocheilus coloradensis Banks, 1910. Journ. New York Ent. Soc., vol. 18, p. 121, ♀. Type: ♀, Clear Creek, Colo. (Cambridge).

MALE: Unknown.

FEMALE: Forewing 13.5 to 14.5 mm. long; hind tibia with its dorsal row of teeth strong and the bristles in its dorsolateral row short, only about 0.5 as long as the distance between their sockets; last segment of tarsi without preapical bristles beneath.

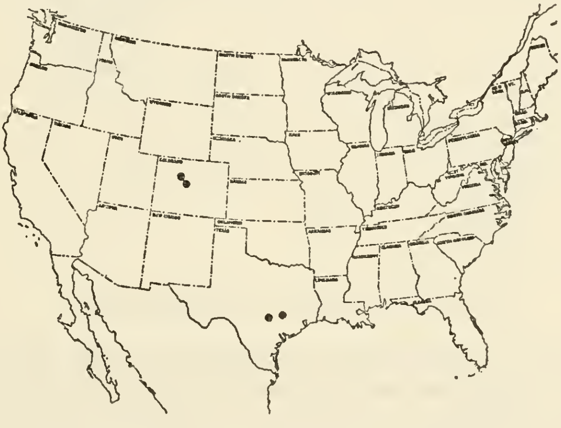


FIGURE 16.—Localities for *Priocnessus coloradensis*.

Rufous. Usually the ocellar area and a line connecting the ocellar area with the eye, upper side of apical four flagellar segments, under side of thorax, various areas along the thoracic sutures and surrounding the scutellum, often the transverse groove of the pronotum, base and apex of propodeum, a complete or incomplete median longitudinal stripe on propodeum, fore coxa behind, middle and hind coxae basally, inwardly and ventrally, part of trochanters, apical one or two segments of tarsi, and base of first abdominal segment, blackish; wings uniformly dark brown.

Specimens: ♀, Bear Creek, Colo., September (Washington). ♀, Boulder, Colo., Aug. 7, 1906, W. P. Cockerell (Washington). ♀ (type), Clear Creek, Colo., Oslar (Cambridge). ♀, Kerrville, Tex., June 2, 1906, F. C. Pratt (Washington). ♀, Lee County, Tex., June (Cambridge).

4. *Priocnessus apache* (Banks)

(Plate 2, figure 16

Priocnemis (*Priocnessus*) *apache* Banks, 1933, Psyche, vol. 40, p. 11, ♀. Type: ♀, Apache Canyon, Santa Catalina Mts. at 5,500 ft., Ariz. (Cambridge).

Male: Forewing 11 to 13 mm. long. Structure as described for the male of *P. nebulosus*.

Light rufous. A spot in front of front ocellus, upper side of flagellum, thorax near bases of wings and of coxae, and base of abdomen, fuscous, the extent of the fuscous quite different in the two specimens at hand; coxae sometimes blackish basally; middle and hind tarsi fuscous apically; wings lightly suffused with yellowish brown, the hind wing a little less so than the forewing; forewing with three transverse brown bands, one across the apex, one centering just beyond the apex of the stigma, and one along the basal vein and nervulus; hind wing tinged with brown apically; seventh tergite with a large whitish spot. The male from Texas has the fuscous markings much more extensive than the male from Arizona.

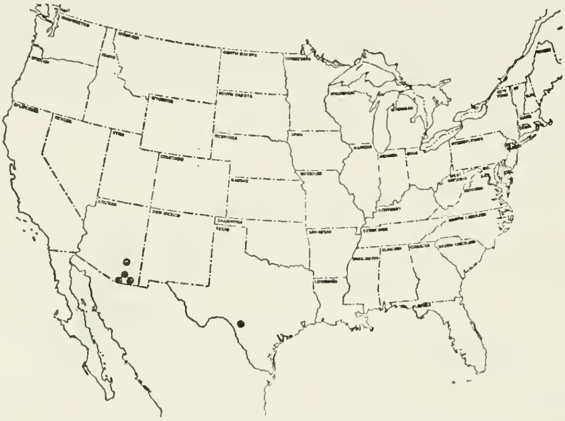


Figure 17.—Localities for *Priocnessus apache*.

Female: Forewing 11 to 15 mm. long; hind tibia with its dorsal teeth strong and the bristles in its dorsolateral row about 0.65 as long as the distance between their sockets; last segment of tarsi without preapical bristles beneath.

Light rufous. Flagellum somewhat infuscate apically; bases of coxae and thorax near the coxal and hind wing articulations, and base of first tergite more or less infuscate; wings strongly suffused with yellowish brown, the forewing with three transverse brown bands as described for the male, the hind wing brownish apically.

SPECIMENS: ♀, Baboquivari Mts., Ariz., Aug. 15, 1924, O. C. Poling (Berkeley). ♀, Ramsey Canyon, Huachuca Mts., Ariz., Sept. 1 and 2, 1927, J. C. Bradley (Ithaca). ♀ (type), Santa Catalina Mts., 5,500 ft., Apache County, Ariz., July 25, 1917 (Cambridge). ♂, Tucson, Ariz., F. H. Snow (Lawrence). ♀, southern Arizona (Cambridge). ♂, Devils River, Tex., May 5, 1907, E. A. Schwartz (Washington).

This species occurs in the Lower Sonoran fauna.

5. *Priocnessus nigricans*, new species

MALE: Unknown.

FEMALE: Forewing 15 mm. long; hind tibia with its dorsal teeth rather strong, its laterodorsal row of bristles long, about 0.9 as long as the distance between their sockets; under side of fifth tarsal segment with about two preapical bristles.

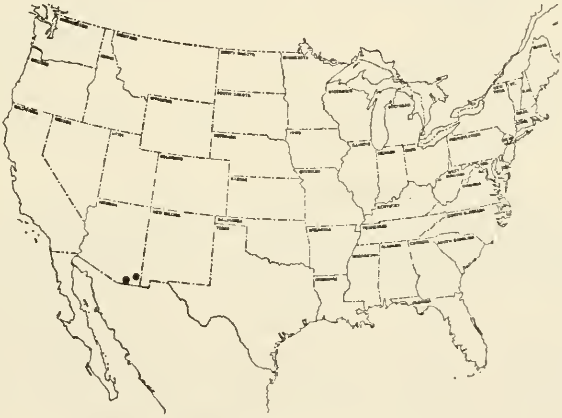


FIGURE 18.—Localities for *Priocnessus nigricans.*

Black. Flagellum orange, somewhat infuscate apically and on the basal part of the first segment; wings orange, infuscate basally to the level of the apex of the anal lobe; apical margin of forewing vaguely dusky.

TYPE: ♀, Santa Rita Mts., Ariz., July 19, 1938, D. W. Craik (Lawrence).

PARATYPE: ♀, Tex Canyon, 5,000 to 6,000 ft., Chiricahua Mts., Ariz., Sept. 16, 1927, J. A. Kusche (San Francisco).

6. *Priocnessus nuperus* (Cresson)

Pompilus (*Priocnemis*) *nuperus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 118, ♀. Lectotype: ♀, Pennsylvania (Philadelphia).

Male: Forewing 9.5 to 13 mm. long; clypeus very large, apically strongly raised upward and outward, its apical margin with a median apical tooth; posterior side of median flagellar segments with a longitudinal groove, within which is a longitudinal row of enlarged specialized setae; middle and hind coxae unusually large; hind trochanter beneath with an apical tubercle like a blunt spine; subgenital plate tongue-shaped, its median longitudinal ridge high, broad, flat-topped, abruptly evanescent beyond the apical 0.75 of the subgenital plate.

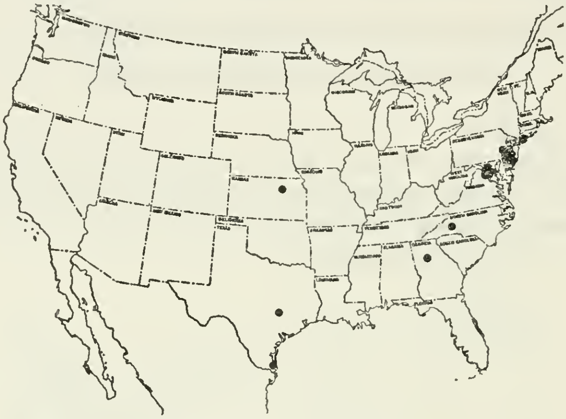


Figure 19.—Localities for *Priocnessus nuperus*.

Rufous. Most of mandible, lateral third of clypeus, face, lower corners of frons, broad hind orbits, knees, tibiae, and first to fourth tarsal segments, orange or bright fulvous; flagellum brown, orange on the central third and on the underside of the basal third; ocellar area, a small mark above the antennal socket, under side of thorax, region of plural sutures, back side of front and middle coxae, most of hind coxa, upper side of middle and hind trochanters, and base of first tergite, blackish, the extent of the blackish markings variable; wings uniformly dark brown.

Female: Forewing 13 to 17 mm. long; hind tibia with its dorsal teeth very strong and erect, and the bristles in its dorsolateral row long, about 0.8 as long as the distance between their sockets; last segment of tarsi with about 3 to 8 preapical bristles beneath.

Rufous. Flagellum with the second, third, and adjacent ends of the first and fourth segments yellowish; flagellum beyond the basal 0.3 of fourth segment blackish; ocellar area, much of back side of head, thorax except for top of pronotum, mesoscutum, scutellum, postscutellum, and often area on mesopleuron and propodeum, most of coxae, and base of first abdominal segment, black; tegula rufous; wings dark brown.

The species *nuperus* belongs to a species group separate from the Nearctic *nebulosus, dakota, coloradensis,* and *apache,* as evidenced by the specialized male clypeus, flagellum, coxae, and subgenital plate and in the female by possession of preapical bristles on the fifth tarsal segment. The Nearctic *nigricans* belongs probably in the *nuperus* species group but without its male this cannot be concluded with certainty.

Specimens (20 ♂, 21♀): From District of Columbia; Georgia (Atlanta); Kansas (Riley County); Maryland (Glen Echo and Takoma Park); New Jersey (Gloucester County, Moorestown, and Riverton); New York (Farmingdale); North Carolina (Hamrick); Pennsylvania (Germantown, Ogontz School, and Philadelphia); Texas (Brownsville and Lee County); and Virginia (Arlington, Black Pond in Fairfax County, Dunn Loring, and Great Falls).

Dates of collection are mostly from July 2 to Sept. 5. Those outside of this range are: Jan. 20 and Mar. 23 at Brownsville, Tex.; Oct. 18 in Riley County, Kans.; and October in Lee County, Tex. The usual habitat is along the edges of mesophytic deciduous woods bordering on overgrown fields. There is one record of a female taken at *Liriodendron* honeydew.

This species occurs in the Carolinian and Austroriparian faunal areas. Except in Texas and Kansas, adults have been taken only from July to September, with a few stragglers into October.

Genus *Priocnemioides* Radoszkowski

Priocnemioides Radoszkowski, 1888, Bull. Soc. Imp. Nat. Moscou, new ser., vol. 2, p. 482. Type: *Pompilus* (*Priocnemis*) *fulvicornis* Cresson; designated by Banks, 1944.

Prionocnemoides Dalla Torre, 1897, Catalogus hymenopterorum . . . , fasc. 8, p. 211 (emendation).

Priocnemoides (!) Ashmead, 1900, Canadian Ent., vol. 32, p. 187 (misspelling).

Cheilotus Bradley, Mem. Soc. Cubana Hist. Nat., vol. 18, p. 124, 1946 (new synonymy). Type: *Pompilus ignipennis* Cresson.

Medium or large sized species of average stoutness, the Nearctic species with forewing 9 to 26 mm. long; clypeus rather large, convex; pronotum of moderate length, its hind margin arcuate; carina on mesosternum in front of each middle coxa distinctly angulate medially, at the angulation usually produced into a distinct tooth (In all other Nearctic Pepsini this carina is evenly curved and without a toothlike projection.); second intercubital vein straight, oblique; second recurrent vein joining the second cubital cell near its apical 0.75; cubital vein reaching the wing margin; base of first discoidal cell without a distinct irregularity in the membrane; nervulus beyond basal vein by about 0.2 to 0.7 its length; nervellus ending at, beyond, or sometimes just before juncture of cubitella with discoidella; anal lobe about 0.75 as long as submediella (pl. 1, fig. 5); dorsal edge of hind tibia of female with a distinct serration, of male usually with a weaker serration, or sometimes smooth; brush on inner side of hind tibia rather narrow, with a subapical constriction or interruption; under side of hind tarsus of male with a close fringe of hairs extending from its base to beyond the middle (This fringe is absent in all other Nearctic Pepsinae except *Cryptocheilus*.); last tarsal segment with two regular rows of bristles beneath; tooth on tarsal claws erect, acute.

This genus is restricted to the Western Hemisphere. It is closely related to *Cryptocheilus*. Three species groups, of which two are Nearctic, are known to me. See the keys and descriptions for their characters.

Key to the Nearctic species of Priocnemioides

1. Brush on inner side of hind tibia not interrupted, only narrowed subapically; nipples on posterior part of apical margin of fore coxa weak; second sternite of female with a pair of large, weak, cushionlike swellings but without tubercles. MAGNUS GROUP 2
   Brush on inner side of hind tibia interrupted subapically, or in some females not quite interrupted but very strongly narrowed subapically; nipples on posterior part of apical margin of fore coxa well developed; second sternite of female with a pair of more or less distinct tubercles surmounting a pair of more or less distinct swellings. FULVICORNIS GROUP 7
2. Flagellum orange; wings black . . . . 3. **magnus** (Cresson)
   Flagellum black; wings orange to black 3
3. Propodeum and upper part of metapleuron without any wrinkles; hind tibia of male with a dorsal row of distinct oblique teeth; hind tibia of female with the teeth in its dorsal row rather wide, about as wide as the length of the bristles beyond each tooth. SUBSPECIES OF TEXANUS 4
   Propodeum and upper part of metapleuron with at least a few transverse wrinkles; hind tibia of male with a dorsal longitudinal ridge on which teeth are faintly indicated; hind tibia of female with the teeth in its dorsal row narrow, about 0.75 as wide as the bristle beyond each tooth 5
4. Wings almost entirely blackish . . 4a. **texanus atripennis,** new subspecies
   Wings mostly orange . . . . 4b. **texanus texanus** (Cresson)
5. Temple receding behind the eye, so that the head is distinctly narrower across the temples than across the eyes; propodeum and upper part of metapleuron usually completely covered with wrinkles; head and thorax with a rather strong, usually greenish blue iridescence, especially in the female; erect hairs on thorax very long and dense . . . . 1. **aratus,** new species
   Temple not receding behind the eye, the head about as wide across the temples as across the eyes; propodeum and upper part of metapleuron usually only partially covered with wrinkles; head and thorax with a faint purple iridescence; erect hairs on thorax shorter and sparser. SUBSPECIES OF AUSTRINUS 6

6. Wings black or mostly black . . . 2a. **austrinus fuscatus,** new subspecies
Wings mostly orange . . . . 2b. **austrinus austrinus** (Banks)
7. Forewing entirely black . . . . 5. **fulvicornis** (Cresson)
Forewing mostly orange, or black with a large subapical orange spot (forewing entirely black in a Neotropic subspecies of *unifasciatus*) 8
8. Temple receding behind the eye, so that the head as seen from above is distinctly narrower across the temples than across the eyes; male subgenital plate with a weak longitudinal elevation that tapers from the base; forewing orange with a relatively broad fuscous apex that reaches or just invades the apex of the radial cell (pl. 2, fig. 17) . . 6. **angusticeps,** new species
Temple not receding but slightly swollen behind the eye so that as seen from above the head across the temples is as wide as or slightly wider than across the eyes; male subgenital plate with a longitudinal raised spatulate area; forewing in the Nearctic subspecies either blackish with a subapical orange spot or mostly orange with a relatively narrow fuscous apex, the fuscous area not reaching the apex of the radial cell. SUBSPECIES OF UNIFASCIATUS . . 9
9. Wings black, the forewing with a large subapical orange spot (pl. 2, fig. 18); male seventh sternite with the raised spatulate area a little less sharply defined . . . . 7a. **unifasciatus unifasciatus** (Say)
Wings orange, infuscate basally and apically; male seventh sternite with the raised spatulate area a little more sharply defined 10
10. Basal infuscation of forewing extending about 0.35 the distance to the basal vein . . . . 7b. **unifasciatus cressoni** (Banks)
Basal infuscation of forewing extending about 0.25 the distance to the basal vein (pl. 2, fig. 19) . . . . 7c. **unifasciatus californicus,** new subspecies

MAGNUS GROUP

Mesosternum with a weak triangular projection on the ridge in front of each middle coxa; nipples on posterior part of apical margin of fore coxa very weak; brush on inner side of hind tibia not interrupted subapically in either sex, slightly to strongly narrowed subapically; second sternite of female with a pair of large, weak, cushionlike swellings but without tubercles; sixth sternite of male gently concave, with stiff erect hairs on each side; subgenital plate of male gently concave, mediobasally with a faint longitudinal raised area, its apex broadly rounded, and its apical and lateral margins with sparse long, and dense short upright hairs.

This species group includes the Nearctic *magnus*, *aratus*, *austrinus*, and *texanus*. With its weak tubercles on the fore coxa and weakly modified second sternite of the female it is a connecting link with the genus *Cryptocheilus*. The species *aratus* is somewhat intermediate to the *fulvicornis* group.

1. *Priocnemioides aratus*, new species

Forewing of male 19 to 20 mm. long, of female 20 to 26 mm. long; clypeus of male about 2.1 as wide as long, of female about 2.4 as wide as long; temple receding from just behind the eye, so that the head as seen from above is distinctly narrower across the temples than

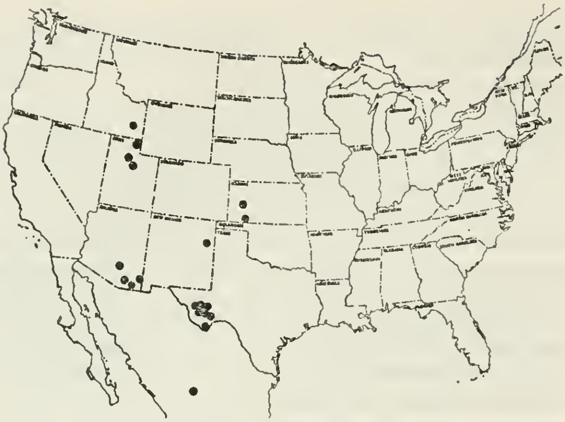


FIGURE 20.—Localities for *Priocnemioides aratus*.

across the eyes; propodeum and upper part of metapleuron with sharp transverse wrinkles, the wrinkles sharpest in the female; erect hairs on head and thorax longer and more conspicuous than in the other species of the *magnus* group; nipples on posterior part of apical margin of fore coxa a little stronger than in the other species of the *magnus* group; legs more slender and with longer bristles than in other species of the *magnus* group, the hind femur about 5.4 as long as wide; hind tibia of male subcarinate dorsally, without distinct teeth; hind tibia of female with a dorsal row of strong, rather narrow teeth that are about 0.8 as wide as the length of the bristles beneath each; sixth sternite of male basally and laterally with long erect black hairs, discally with sparser, shorter, less conspicuous erect hairs; subgenital plate of male with marginal irregular long hairs, discally with moderately long hairs which in this species are mostly reflexed.

Black. Wings orange, their apices and extreme bases rather abruptly infuscate; head and thorax with an iridescence that is usually greenish blue, especially strong in the female.

TYPE: ♀, Douglas, Ariz., Oct. 5, 1927, W. W. Jones (Berkeley).

PARATYPES: 15♂, 19♀ from Arizona (Apache, Douglas, 10 miles east of Sonoita, and Tucson); Idaho (Pocatello); Kansas (Finney County and Meade County); New Mexico (Tucumcari); Texas (Alpine, The Basin at 5,000 ft. in the Chisos Mts. of Big Bend National Park, Fort Davis, Fort Stockton, Limpia Canyon at 5,000 ft. in the Davis Mts., Marathon, and Marfa); Utah (Logan, Provo, and Salt Lake County); and Mexico (Canutillo in Durango).

Most dates of collection are from July to September. The extreme range is from May 30 (in Salt Lake County, Utah) to Oct. 5 (at Douglas, Ariz.).

This species occurs in the Upper and Lower Sonoran faunas of the Southwest, and has been taken also in southern Idaho. Adults occur mostly from July to September.

2. *Priocnemioides austrinus* (Banks), new combination

Forewing of male 15 to 21 mm. long, of female 18 to 22 mm. long; propodeum and upper part of metapleuron partially or almost completely covered with weak transverse wrinkles, these always definite in the female but often obsolescent in the male; hind tibia of male subcarinate dorsally, with a rudimentary series of teeth; hind tibia of female with a dorsal row of strong, rather narrow teeth that are about 0.8 as wide as the length of the bristle beneath each; sixth sternite of male with erect brown hairs, longer laterally than discally, without the contrast in length and density between the sides and the disc that obtains in other species of the *magnus* group; subgenital plate of male with a marginal brush of longer hairs, these hairs hardly longer on the apicolateral margin than on the apical margin; discal hairs on male subgenital plate short, declinate. Structure otherwise as described for *P. texanus*.

Black. Wings orange with the base and apex infuscate, to entirely black, according to the subspecies; head and thorax with a faint purple iridescence.

There are two subspecies, one in the Southwestern States and the other from eastern Kansas to Alabama.

2a. *Priocnemioides austrinus fuscatus*, new subspecies

Wings blackish, tinged with orange along the costal margin and on the stronger veins of the forewing, and with a more extensive orange

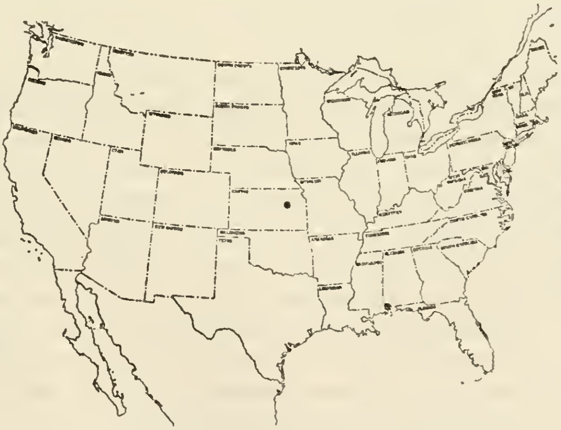


Figure 21.—Localities for *Priocnemioides austrinus fuscatus*.

suffusion caused by orange hairs against the blackish wing membrane. The paratype has more orange on the wings than the type.

TYPE: ♀, Theodore, Ala., June 12, 1917 (Ithaca).

PARATYPE: ♀, on flowers of *Cicuta maculata*, Osage County, Kans., Aug. 5, 1950, H. E. Evans (Evans).

2b. *Priocnemioides austrinus austrinus* (Banks)

PLATE 1, FIGURE 5

Cryptocheilus austrinus Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 102, ♀. Type: ♀, Texas (Cambridge).

Wings orange, infuscate apically and at the base. Specimens from central Kansas and Texas often have the orange of the wings somewhat suffused with brownish, and are thus somewhat intermediate to the subspecies *fuscatus*.

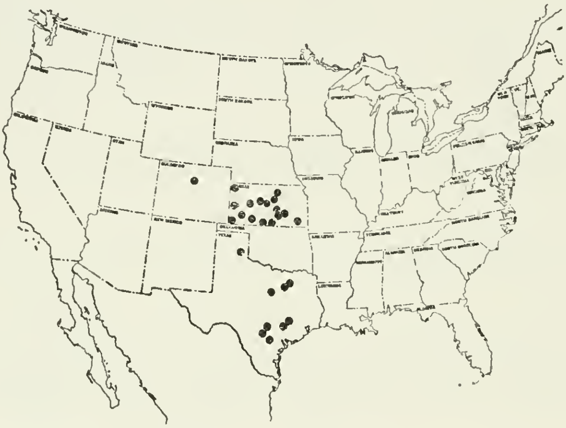


FIGURE 22.—Localities for *Priocnemioides austrinus austrinus*.

SPECIMENS (28♂, 22♀): From Colorado (Boulder); Kansas (Barber County, Butler County, Cheyenne County, Comanche County, Dickinson County, Ellis County, Ford County, Gray County, Hamilton County, Harvey County, Manhattan, Morton County, Neosho County, Russell County, Scott City, and Sedgwick County); and Texas (Clarendon, College Station, Cypress Mills, Dallas, Fedor, Hunt County, Maxwell, Williamson County, and Wolfe City).

Most collection dates are from June 16 to the end of August. Those outside of this range are: May 8, May 21, and Oct. 2 at College Station, Tex.; June 6 at Fedor, Tex.; Sept. 17 at Maxwell, Tex.; and Sept. 22 at Dallas, Tex. Flower records comprise *Melilotus alba*, *Symphoricarpos*, *Ampelopsis arborea*, and *Solidago*.

This subspecies occurs in Texas, Kansas, and Colorado (Boulder). Adults occur mostly from June to September.

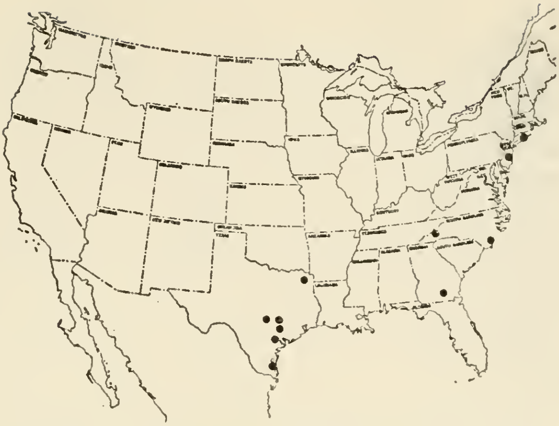


FIGURE 23.—Localities for *Priocnemioides magnus.*

3. *Priocnemioides magnus* (Cresson)

Pompilus (*Priocnemis*) *magnus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 111, ♀. Type: ♀, Georgia (Philadelphia).

Forewing of male 14 to 19 mm. long, of female 17 to 22 mm. long. Propodeum and upper part of metapleuron smooth, without wrinkles; hind tibia of male subcarinate and with rudimentary teeth dorsally; hind tibia of female with a dorsal row of rather narrow teeth that are about 0.8 as wide as the length of the bristle beyond each; sixth sternite of male laterally with long, erect, black hairs, discally with shorter, sparse, erect hairs; subgenital plate of male apically with short, dense, erect hairs, the hairs longer apicolaterally.

Black. Flagellum orange; wings black; head and thorax without distinct iridescence.

SPECIMENS: ♂, 2♀, Tifton, Ga., F. A. Eddy (Cambridge). 2♀, Tifton, Ga. (Washington). ♀ (type), Ga. (Philadelphia). ♀, Lakehurst, N. J., July 21, 1921 (Cambridge). ♀, Riverhead, N. Y., Aug. 2, 1917, W. T. Davis (Cambridge). ♂, Judson, N. C., July 19, 1923, J. C. Crawford (Raleigh). ♀, Spout Springs, N. C., July 10, 1929 (State College, Raleigh). ♂, Wilmington, N. C., June 23, 1928, T. B. Mitchell (State College, Raleigh). ♀, Bryant, Tex., June 17, 1927, S. E. McGregor (Krombein). 2♀, Fedor, Tex., May 19 and 25, 1909, Birkmann (Cambridge). ♀, Los Olmos Creek, Kenedy County, Tex., June 18, 1948, H. E. Evans (Evans). ♂, ♀, Mount Pleasant, Titus County, Tex., June 13, 1918, H. E. Evans (Evans). ♂, Rock Island, Tex., May 31, 1922, G. O. Wiley (St. Paul). ♂, Victoria, Tex., Aug. 16, 1913, J. D. Mitchell (Washington). ♀, Williamson County, Tex., May 29, 1933, J. E. Gillaspy (College Station, Tex.).

This species occurs in the Gulf and Atlantic States north to Long Island.

4. *Priocnemioides texanus* (Cresson)

Forewing of male 12 to 16 mm. long, of female 15 to 20 mm. long; clypeus of male about 2.5 as wide as long, of female about 2.7 as wide as long; temple not receding from just behind the eye, so that the head as seen from above is almost or quite as wide across the temples as across the eyes; propodeum and metapleuron smooth, not at all wrinkled; hind femur about 4.7 as long as wide; teeth on dorsal side of hind tibia of male distinct, oblique, of female prominent and rather wide, about as wide as the length of the bristle beyond each; sixth sternite of male laterally with long, erect, black hairs, discally without long erect hairs; subgenital plate of male with a marginal brush of hairs, these hairs longer on the lateroapical margin than on the apical margin; discal hairs on male subgenital plate short, declinate.

Black. Wings almost entirely black to mostly orange, according to the subspecies; head and thorax with a faint purple iridescence.

This species occurs in the Southwestern States and eastward to Louisiana. It comprises two subspecies.

4a. *Priocnemioides texanus atripennis*, new subspecies

Wings black.

Type: ♂, Opelousas, La., May 25, 1897, G. R. Pilate (Washington, USNM 61696).

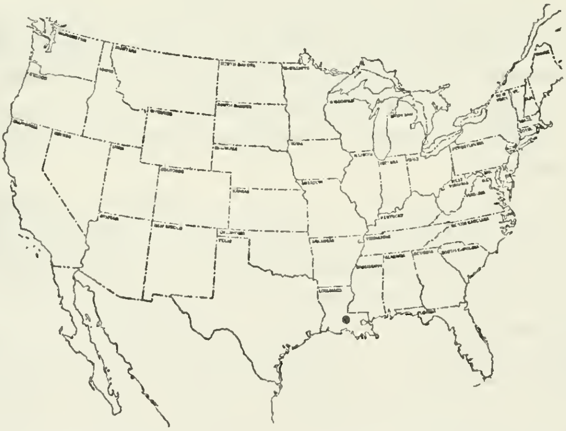


Figure 24.—Locality for *Priocnemioides texanus atripennis.*

4b. *Priocnemioides texanus texanus* (Cresson)

Priocnemis texanus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 204, ♂, ♀.
Lectotype: ♀, Texas (Philadelphia).

Wings mostly orange, ranging from clear orange with the apical part and the extreme base rather abruptly infuscate in specimens from the

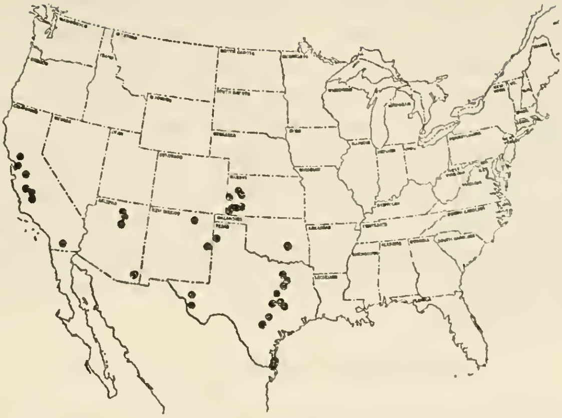


FIGURE 25.—Localities for *Priocnemioides texanus texanus.*

greater part of its range, to somewhat suffused with brownish and with the basal and apical parts darker in many specimens from Kansas and eastern Texas. These latter specimens are somewhat intermediate to the subspecies *atripennis.*

SPECIMENS (84♂, 43♀): From Arizona (Apache, Joseph City, Kayenta, and Navajo Mt. in Navajo County); California (Coalinga, Davis, Dos Palos, Firebaugh, Hemet, Mojave River in Apple Valley, Oxalis in Fresno County, and Patterson); Kansas (Finney County, Grant County, Gray County, Hamilton County, Haskell County, Morton County, and Scott City); New Mexico (Broadview and Cimarron); Oklahoma (McAlester); Texas (Bexar County, Brazos County, Brownsville, Calvert, Fort Davis, Friona, Hunt County, Kaufman County, McLennan County, Marfa, Maxwell, Navarro, Port Isabel, Roanoke, Waco, and Williamson County); and México (Puerta de la Goriona at 4,900 ft. in the Sierra del Carmen of Coahuila).

Most collection dates are from June 1 to Aug. 21. Those outside of this range are May 25 in Williamson County, Tex.; May 28 on the Mojave River in Apple Valley, Calif.; May 30 at Navarro, Tex.; May 31 in Bexar County, Tex.; Sept. 5 at Firebaugh, Calif.; and Oct. 8 at Calvert, Tex. Flower records comprise three collections on *Asclepias* and one each on *Avicennia, Baccharis,* and *Petalostemum.*

This subspecies is widespread in the Southwestern States and occurs in adjacent México. Adults occur during the summer months.

FULVICORNIS GROUP

Mesosternum with a weak triangular projection on the ridge in front of each middle coxa; nipples on posterior part of apical margin of fore coxa well developed; brush on inner side of hind tibia interrupted subapically, or in some females not quite interrupted; second sternite of female with a pair of large, weak, cushionlike swellings surmounted by a pair of weak approximate tubercles; sixth sternite of male gently concave, with some long erect hairs on each side; subgenital plate of male approximately flat, with a median basal longitudinal elevation, and its free margin with some long hairs.

This species group includes *fulvicornis* and *angusticeps* of North America; *unifasciatus* of North and South America; *molestus* Banks 1946, of South America; and (*Pompilus*) *Priocnemioides flammipennis* Smith, new combination (=*Pompilus ignipennis* Cresson, new synonymy), of the West Indies.

5. *Priocnemioides fulvicornis* (Cresson)

Pompilus (*Priocnemis*) *fulvicornis* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 112, ♂, ♀. Lectotype: ♀, Pennsylvania (Philadelphia).

Forewing of male 12.5 to 16.5 mm. long, of female 14.5 to 21 mm. long; temple rather full, the head almost or quite as wide at the temples as at the eyes; suberect hair on upper part of pronotum rather short; propodeum with rather fine obscure transverse wrinkling, or in the male usually smooth; second sternite of female with the tubercles averaging a little more prominent and farther apart than in *P. angusticeps* or *P. unifasciatus*; subgenital plate of male with a low, weak, median longitudinal ridge that tapers from the base.

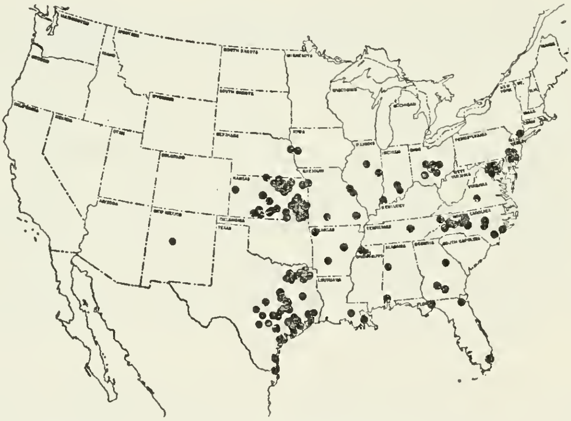


Figure 26.—Localities for *Priocnemioides fulvicornis*.

Black. Flagellum orange; wings entirely black.

Specimens (219♂, 223♀): From Alabama (Mobile and Tuscaloosa); Arkansas (Arkadelphia, Hazen, and Springdale); District of Columbia; Florida (Coconut Grove, Jacksonville, Miami, and Miccosukee); Georgia (Albany, Tifton, and Warrenton); Illinois (Hanna

City, Homer Park, and Peoria); Indiana (Bedford, Lawrence County, and Posey County); Iowa (Sergeant Bluff); Kansas (Allen County, Anderson County, Baldwin, Barber County, Bourbon County, Cherokee County, Clark County, Clay County, Comanche County, Cowley County, Crawford County, Dickinson County, Douglas County, Franklin County, Harvey County, Kiowa County, Labette County, Manhattan, Morris County, Onaga, Randolph, Reno County, Rice County, Russell County, Sedgwick County, Smith County, Topeka, Wallace County, and Winfield); Louisiana (Darrow, New Orleans, Opelousas, St. Landry, Schriever, and Sunset); Maryland (Burtonsville, Glen Echo, Prince Georges County, Springfield, and Takoma Park); Mississippi (De Soto County and Holly Springs); Missouri (Atherton, Jackson, Overland, St. Louis, and Springfield); Nebraska (South Sioux City); New Jersey (Gloucester County, Moorestown, and Westville); New Mexico (Magdalena Mts.); New York (Brooklyn); North Carolina (Beaufort, Hobucken, Kingsboro, Marion, Mount Mitchell, Overhills, Raleigh, Salisbury, Statesville, Swannanoa, Wallace, and Winston); Ohio (Champaign County, Highland County, Hocking County, Jackson, Lancaster, and Pickaway County); Pennsylvania (Philadelphia); Tennessee (Grassy Grove in Cumberland County, and Roan Mountain in Carter County); Texas (Anahuac, Boca Chica, Brownsville, Burleson County, Calvert, College Station, Cypress Mills, Dallas, Dayton, Dickinson, Fedor, Fort Bend County, Galveston, Giddings, Hopkins County, Hunt County, Liberty, Liberty Hill, McKinney, McLennon County, Maxwell, Mount Pleasant, Olivia, Palmetto Park at Gonzales, Paris, Plano, Port Isabel, Robstown, Rock Island, Seagoville, San Jacinto County, Trinity, Victoria, Waco, Wellsville, Williamson County, Willis, and Wolfe City); and Virginia (East Falls Church, Falls Church, Nelson County, and Vienna).

Dates of capture in the Upper Austral Zone are mostly in July and August, but in the Lower Austral Zone the normal flight season seems to be May to early October. Early and late dates of special interest are: Apr. 6 at College Station, Tex.; Apr. 11 at Miami, Fla.; Apr. 17 at Victoria, Tex.; May 9 at Opelousas, La.; June 9 at Kingsboro, N. C.; June 13 at Raleigh, N. C.; Sept. 5 at Takoma Park, Md.; Sept. 9 at Jackson, Ohio; October at Winfield, Kans.; Oct. 1 at Raleigh, N. C.; Oct. 3 at Victoria, Tex.; Oct. 5 to 9 at Jacksonville, Fla.; and Oct. 30 at Anahuac, Tex. and in Bexar County, Tex. Flower records include *Melilotus alba*, *Polygonum lapathifolium*, *Ampelopsis arborea*, *Monarda punctata*, *Euphorbia marginata*, *Polytaenia nuttallii*, and *Solidago*. The only host record is *Lycosa avida*, being transported by a female collected at Baldwin, Kans., by J. C. Bridwell.

This is a common species of the Austroriparian and Carolinian faunas. There is an isolated record from New Mexico (2♂, Magdalena Mts., N. Mex., July 1894, F. H. Snow (Lawrence)). Adults are on the wing mostly in July and August.

6. *Priocnemioides angusticeps*, new species

PLATE 2, FIGURE 17

Forewing of male 11 to 15 mm. long, of female 14 to 18 mm. long; temple rather sloping, the head somewhat narrower across the temples than across the eyes; pronotum of male a little longer than in *P. fulvicornis* or *P. unifasciatus;* suberect hair on upper part of pronotum moderately long; propodeum with rather fine transverse wrinkling, most distinct in the female; subgenital plate of male with a low, weak, median longitudinal ridge that tapers from the base.

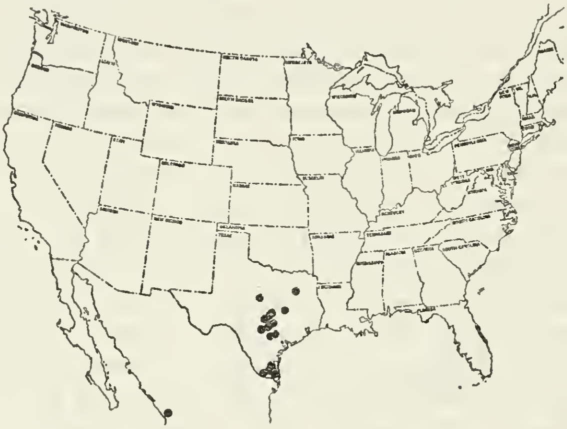


FIGURE 27.—Localities for *Priocnemioides angusticeps.*

Black. Flagellum orange; wings orange, infuscate basally and apically. In the forewing the basal infuscate area extends about 0.4 the distance to the basal vein and the apical infuscation just reaches or invades the apex of the radial cell.

This species is superficially similar to *P. unifasciatus cressoni* but may be distinguished by the tapering shape of the median longitudinal raised area on the male subgenital plate, the narrower temple, and the broader apical infuscation on the forewing.

TYPE: ♂, Brownsville, Tex., May (Washington, USNM 61697).

PARATYPES (37♂, 38♀): From Texas (Bexar County, Boca Chica, Brownsville, Burnet, Camp Barkley in Taylor County, Dallas, Edinburgh, Fedor, Liberty Hill, Maxwell, New Braunfels, Palmetto Park at Gonzales, Port Isabel, Victoria, and Williamson County); and México (Ahuacatlán in Nayarit, Alpuyeca in Morelos, Guadalajara, Los Mochis in Sinaloa, Medellín in Vera Cruz, Oaxaca, Tejupilco in Temescaltepec, and Zetacuaro in Michoacán).

Dates of capture are mostly from June to September. Those outside of this range are: April at Edinburgh, Tex.; May at Brownsville, Tex.; May 17 at Burnet, Tex.; Oct. 4 at Camp Barkley, Taylor County, Tex.; Oct. 15 in Brazos County, Tex.; and Dec. 10 at Los Mochis, Sinaloa, México. Flower records include only *Euphorbia marginata.*

This species is known only from Texas and México. Adults are on the wing through most of the growing season.

7. *Priocnemioides unifasciatus* (Say)

Forewing of male 9 to 17 mm. long, of female 10 to 21 mm. long; temple rather swollen, so that the head across the temples is as wide or a little wider than across the eyes; suberect hair on upper part of pronotum moderately long; propodeum with rather fine but sharp transverse wrinkling, most distinct in the female; seventh sternite of male with a median longitudinal raised spatulate area.

Black. Flagellum fulvous; wings varying from orange with the base and apex infuscate to entirely black, according to the subspecies.

This species ranges from the United States to Patagonia, but is represented in that area by a number of subspecies which because of their evident color differences have been considered species. They are structurally similar but with gradual geographic variation in some of the characters which reach distinctive extremes at the ends of the range. The structural differences between the subspecies, all minor, are in the width of the head across the temples (widest in the Chilean subspecies, thence gradually narrowing to the Nearctic subspecies *unifasciatus*), the prominence of the raised spatulate area on the male seventh sternite (most prominent in the Chilean subspecies, thence gradually less prominent to the Nearctic subspecies *unifasciatus*) and size (averaging smallest in the Chilean and Argentinean subspecies and largest in the North American forms). In addition, the Chilean subspecies has the flagellar segments somewhat shorter than in the others. The color differences are described below, where all the subspecies are treated, though only three of them are Nearctic.

Key to the subspecies of Priocnemioides unifasciatus

1. Forewing entirely black; habitat: Perú, Bolivia, and parts of Paraguay and Brazil . . . . 7f. ***peruvianus*** (Rohwer)
   Forewing more or less orange 2
2. Forewing black with a large subapical orange spot (pl. 2, fig. 18); habitat: United States east of the 100th. meridian . . . . 7a. ***unifasciatus*** (Say)
   Forewing orange or infuscate orange with more or less of the base and apex fuscous 3

3. Basal and apical infuscate portion of forewing merging rather gradually with the orange of the rest of the wing, which itself is usually dusky orange rather than clear orange; habitat: most of Argentina and adjacent Brazil. 7e. ***luteicornis*** (Lepeletier)

 Basal and apical infuscate portions of forewing joining rather abruptly with the clear orange of the rest of the wing 4

4. Base of forewing infuscate beyond the tegula for about 1.5 the length of the tegula; longitudinal spatulate area on male subgenital plate a little more strongly raised; flagellar segments of female a little shorter; habitat: Chile and coastal Perú . . . . 7g. ***dumosus*** (Spinola)

 Base of forewing infuscate beyond the tegula for 2.0 or more the length of the tegula; longitudinal spatulate area on male subgenital plate a little less strongly raised; flagellar segments of female a little longer 5

5. Base of forewing infuscate for about 0.65 the distance to the basal vein; habitat: Panamá and northern South America . . . . 7d. ***urichi*** Banks

 Base of forewing infuscate for about 0.2 to 0.4 the distance to the basal vein . 6

6. Base of forewing infuscate for about 0.35 the distance to the basal vein; habitat: México and southwestern United States, except California and Baja California . . . . 7b. ***cressoni*** (Banks)

 Base of forewing infuscate for about 0.25 the distance to the basal vein (pl. 2, fig. 19); habitat: California and Baja California. 7c. ***californicus,*** new subspecies

7a. *Priocnemioides unifasciatus unifasciatus* (Say)

FIGURE 1,*e*; PLATE 2, FIGURE 18

Pompilus unifasciatus Say, 1828, American entomology, vol. 3, p. 92 (Leconte edition, vol. 1, p. 92), ♀. Type: ♀, Easton, Pa. (destroyed).

Black. Pubescence of face and clypeus dark brown; flagellum orange; wings blackish, the forewing with a large subapical orange spot which is not sharply defined.

A specimen from Victoria, Tex., is intermediate to the subspecies *cressoni*.

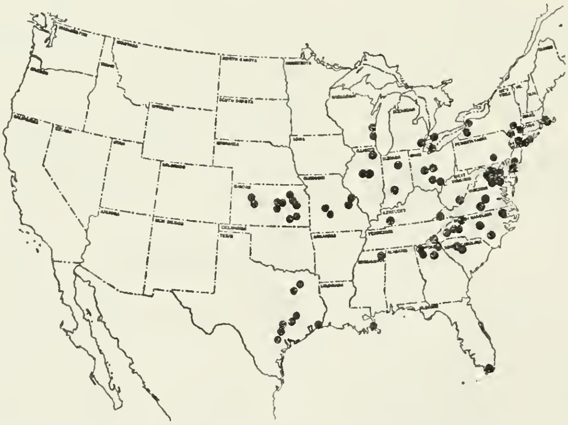


FIGURE 28.—Localities for *Priocnemioides unifasciatus unifasciatus*.

Specimens (56♂, 136♀): From Florida (Paradise Key); Georgia (Atlanta, Head River, Sitton's Gulch, Summerville, and Yonah Mountain); Illinois (Algonquin, Bloomington, and Hanna City); Indiana (Allen County and Trevlac); Kansas (Allen County, Baldwin, Manhattan, Osborne County, Randolph, Riley County, Russell County, Topeka, Wilcox County, and Wilson County); Kentucky (Trenton); Louisiana (New Orleans); Maryland (Chesapeake Beach, Indian Head, and Laurel); Massachusetts (Sagamore and Woods Hole); Michigan (Wayne County); Mississippi (Iuka); Missouri (Cadet, St. Louis, Springfield, and Willard); New Jersey (Alpine and Gloucester County); New York (Bear Mt., Cold Spring Harbor, Fort Montgomery, Hamburg, Mastic, Niagara Falls, and Tuxedo); North Carolina (Blantyre, Bryson City, Elizabeth City, Fayetteville, Hamrick, Jonas Ridge, Swannanoa, and Wilkes County); Ohio (Athens County, Delaware County, Hocking County, Logan County, and Put in Bay); Ontario (Chatham and Pelee Island); Pennsylvania (Columbia and Rockville); South Carolina (Greenville and Table Rock in Greenville County); Texas (Bastrop County, Brazos County, Dallas, Fedor in Lee County, Hunt County, Jefferson County, Madison County, and Victoria); Virginia (Dunn Loring, Falls Church, Germantown, Great Falls, Hungry Mother, Nelson County, Pennington Gap, Vienna, Wingina, and Wytheville); West Virginia (Bargers Springs and Lewisburg); and Wisconsin (Milwaukee and Washington County).

Most dates of collection fall between July 20 and Sept. 13, or in Texas from June 1 to Sept. 25. Those outside these ranges are "June" in Riley County, Kansas; June 29 at Bloomington, Ill.; July 14 at Columbia, Pa., and at Iuka, Miss.; July 19 in Gloucester County, N. J.; Sept. 17 in Hocking County, Ohio; Sept. 21 at Great Falls, Va., and in Allen County, Ind.; and Oct. 3 at Greenville, S. C., and in Hunt County, Tex. Flower records include *Euphorbia marginata* and *Solidago*. A female was taken at Indian Head, Md., by J. C. Bridwell while transporting *Lycosa riparia*.

This subspecies occurs mostly in the Carolinian fauna. Most adults are on the wing from about July 20 to early September. The favorite habitat seems to be overgrown fields, especially among bushes and along the edges of woods.

7b. *Priocnemioides unifasciatus cressoni* (Banks)

Cryptocheilus flammipennis, as frequently misdetermined by authors.
Cryptocheilus cressoni Banks, 1929, Psyche, vol. 36, p. 326, ♂, ♀. Lectotype: ♀, Texas (Cambridge).

Black. Pubescence of face and clypeus dark brown; flagellum orange; wings orange, fuscous basally and apically. The fuscous

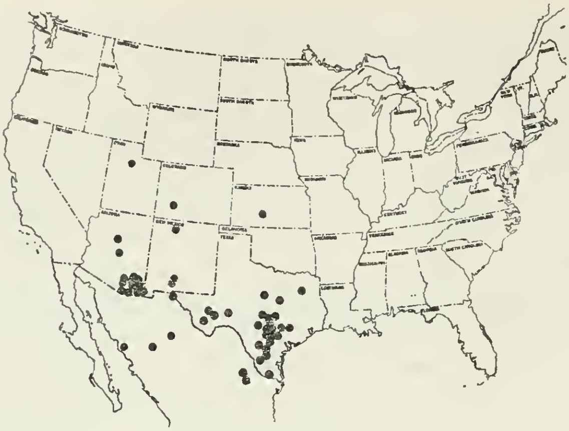


FIGURE 29.—Localities for *Priocnemioides unifasciatus cressoni.*

basal portion extends about 0.35 the distance to the basal vein, and the fuscous apical portion does not reach or just reaches the apex of the radial cell.

This subspecies is superficially similar to and often confused with the species *P. angusticeps* (see p. 60 for distinguishing notes). It has also been confused needlessly with the West Indian *P. flammipennis.*

SPECIMENS (55♂, 96♀): From Arizona (Chiricahua Mts., Douglas, Dragoon Mts., Huachuca Mts., Mormon Lake in Coconino County at 7,000 ft., Nogales, San Bernardino Ranch in Cochise County at 3,750 ft., Santa Rita Mts. at 5,000 to 8,000 ft., Stocton Pass in the Pinaleno Mts., Sunnyside Canyon in the Huachuca Mts., Tucson, and Workman Creek in the Sierra Ancha); Colorado (Berkeley, Clear Creek, and Gunnison); Kansas (Reno County); New Mexico (Hells Canyon, Jemez Mts., Mesilla, and State College); Texas (Abilene, Austin, Bexar County, Boerne, Burnet, Carrizo Springs, Cotulla, Cypress Mills, Dime Box, Eastland County, Edinburg, Fedor, Fort Davis, Frio State Park in Frio County, Hunt County, Laredo, Liberty Hill, Limpia Canyon in the Davis Mts. at 5,000 ft., Longhorn State Park in Burnet County, Marfa, Menard County, New Braunfels, Port Isabel, San Antonio, Sheffield, Twin Sisters, Victoria, and Williamson County); Utah (Salt Lake); Guatemala (Antigua); and México (Chihuahua [city], Coyotes in Durango, El Cercado in Nuevo León, Guadalajara, Jacoma in Michoacán, Juarez, Los Mochis in Sinaloa, México [city], Oaxaca, San Rafael Jicoltepec, Tlalnepantla, Vallecillo in Nueva León, and Xochimilco).

The collection dates fall mostly between May 10 and Oct. 1. Records outside this range are Mar. 28 at Cotulla, Tex.; "April" at Edinburg, Tex.; Apr. 3 and May 4 at San Antonio, Tex.; Apr. 29 and

May 8 in Williamson County, Tex.; May 4 in Hunt County, Tex.; May 6 at Workman Creek, Sierra Ancha, Ariz.; Oct. 5 in Williamson County, Tex.; Oct. 24 at Laredo Tex.; and Oct. 26 at Carrizo Springs, Tex. All the records for males fall between May 8 and July 27, except for a male taken Aug. 8 at Coyotes, Durango, México. Flower records include *Euphorbia marginata, Sapindus drummondii, Condalia lycioides, Polytaenia nuttallii, Tamarix gallica,* and *Baccharis salicina.*

This subspecies occurs in the Lower Sonoran fauna from Texas to Arizona and south to Guatemala.

7c. *Priocnemioides unifasciatus californicus*, new subspecies

PLATE 2, FIGURE 19

Cryptocheilus flammipennis and *Cryptocheilus cressoni*, as frequently misdetermined by authors.

Similar to the subspecies *cressoni* but with less fuscous at the wing bases, the basal infuscation of the forewing extending only about 0.25 the distance to the basal vein.

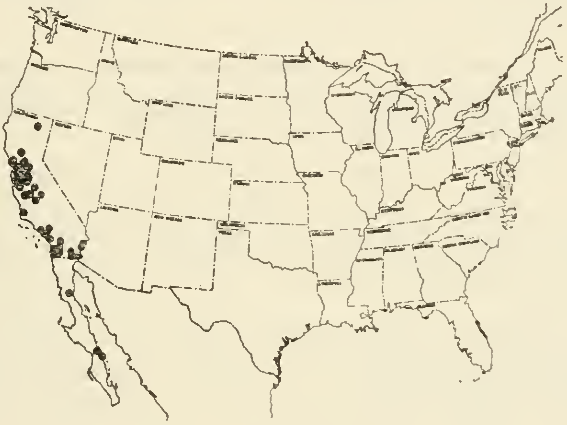


FIGURE 30.—Localities for *Priocnemioides unifasciatus californicus.*

This subspecies bears about the same color and geographic relation to *Priocnemioides unifasciatus cressoni* as does *Hemipepsis ustulata ochroptera* to *H. ustulata ustulata.* It is of interest to note that the subspecies *californicus* extends into Baja California and intergrades with *cressoni* probably near the California-Arizona boundary, while the subspecies *ochroptera* does not reach Baja California and intergrades with its more eastern counterpart (subspecies *ustulata*) in southern California.

TYPE ♀, Mount Diablo, Contra Costa County, Calif., July 10, 1947, U. N. Lanham (Washington, USNM 61698).

PARATYPES (60♂, 163♀, including 3♂, 19♀ collected with the type by P. D. Hurd and U. N. Lanham): From California (Antioch, Benicia, Berkeley, Blythe, Calexico, Canby, Clarksburg, Clayton, Davis, Del Puerto Canyon in Stanislaus County, Dixon, Dos Palos, Firebaugh in Fresno County, Hemet, Holtville, Imperial County, La Grange, Lemoncove, Los Angeles, Mendota, Morgan Hill, Mount Diablo in Contra Costa County, National City, Newport Bay in Orange County, Niles, Nipomo, Old Town in San Diego County, Oxalis in Fresno County, Petaluma, Redwood City, Ripley, Sacramento, Sacramento River Valley, San Diego, San Dimas, San Jose, Stanford University, Telsa in Alameda County, Temecula, Tracy, Vacaville, Walnut Creek, and Willows); and Baja California, México (Catavina, 20 miles north of Comondú, and Purissima).

Most dates of capture are in July and August, but a number of others extend the usual distribution from June 2 to Sept. 27, and the subspecies has been taken at Blythe, Calif., on May 7 and Oct. 3 and at Telsa, Calif. on Oct. 15. Two collections were made on the flowers of *Asclepias*.

This subspecies occurs in central and southern California and in Baja California. Most adults are on the wing from early June to late September.

7d. *Priocnemioides unifasciatus urichi* Banks, new status

Priocnemioides urichi Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 89, ♀. Type: ♀, northwestern part of Trinidad (Cambridge).

Black. Pubescence of face and clypeus medium brown; flagellum orange; wings orange, fuscous basally and apically. The fuscous basal portion extends about 0.65 the distance to the basal vein, and the fuscous apical portion does not reach or just reaches the apex of the radial cell.

Specimens (4♂, 9♀): From Panamá (Chiriqui and Barro Colorado Island); Colombia (Cincinnati); Trinidad; Venezuela (Mérida and Valera); and Ecuador (Mera).

7e. *Priocnemioides unifasciatus luteicornis* (Lepeletier), new status

Calicurgus luteicornis Lepeletier 1845, Histoire naturelle des insectes, hyménoptères, vol. 3, p. 404, ♀. Type: ♀, Province des Mines, Brazil (?Paris).

?*Pepsis Bonariensis* Lepeletier, 1845, Historie naturelle des insectes, hyménoptères, vol. 3, p. 476, ♀. Type: ♀, Buenos Aires, Argentina (?Paris).

Priocnemioides tenebrosus Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 480, ♂, ♀ (new synonymy). Type: ♀, Brazil (Cambridge).

Black. Pubescence of face and clypeus light brown; flagellum orange; wings orange but more or less suffused with brownish and distinctly infuscate basally and apically. The basal and apical infuscation is not as sharply defined as in the subspecies *urichi*, *cressoni*, and *californicus*. Specimens of the present subspecies from Argentina in general have less brownish suffusion on the wings than do those from elsewhere.

Banks (1946) identifies this form as *bonariensis* Lepeletier, which was described originally in *Pepsis*. While Lepeletier's specific description agrees, his generic description of the venation of *Pepsis* does not. An examination of his type may show, however, that this is the form he had.

Specimens (7♂, 15♀): From Argentina (Bolívar, Carcaraña, Córdova, Mendoza, Muñecas, Salta, "San Juan", and Tucumán); Brazil (Campinas, Maldonado, Maracaju in Mato Grosso, and Rio de Janeiro); Perú (Villa Rica); and Uruguay (Montevideo).

7f. *Priocnemioides unifasciatus peruvianus* (Rohwer), new status

Cryptocheilus peruvianus Rohwer, 1913, Proc. U. S. Nat. Mus., vol. 44, p. 440, ♀. Type: ♀, Santa Ana, Perú, 3,000 ft. (Washington).

Black. Pubescence of face and clypeus medium brown; flagellum orange; wings black with a slightly brownish tint.

This subspecies has a strong superficial resemblance to the Nearctic *P. fulvicornis*. It may be distinguished by the longer hair on the upper part of the pronotum and by the more distinct wrinkles on the propodeum, in addition to the specific differences described in the key.

Specimens: ♀, Misiones, Argentina, Feb. 4, 1942, A. L. Parker (Washington). ♀, Santa Cruz, Bolivia, J. Steinback (Cambridge). ♀ (type), Santa Ana, 3,000 ft., Perú, Aug. 3, 1911 (Washington). ♂, Valle Chanchamayo, Perú, 800 m., "1–3–30," Weyrauch (Cambridge).

7g. *Priocnemioides unifasciatus dumosus* (Spinola), new status

Pompilus dumosus Spinola, 1851, *in* Gay, Historia fisica y politica de Chile, zoologia, vol. 6, p. 376, ♂, ♀. Types: Coquimbo, Chile (?Paris).

Black. Pubescence of face and clypeus dark brown; flagellum orange; wings orange with the apical margin and the base for a very short distance (equal to about 1.5 the length of the tegula) fuscous.

Spinola mentioned having specimens from Brazil and from Coquimbo in Chile. Since the Brazilian specimens may have represented a different species or subspecies, the type locality is hereby restricted to Coquimbo, Chile.

Specimens (12♂, 19♀): From Chile (Correntoso River, Maipú, Melipilla, Río Negro, Santiago, Valparaíso, and the mainland near Chiloe Island); and Perú (Lima and Trijillo).

Genus *Cryptocheilus* Panzer

Salius Fabricius, 1804, Systema Piezatorum . . . , p. 127 (preoccupied). Type: *Sphex sexpunctata* Fabricius; designated by Guérin, 1849.

Cryptocheilus Panzer, 1806, Kritische Revision der Insektenfaune Deutschlands . . . , Band 2, p. 120. Type: *Sphex annulata* Fabricius; designated by Westwood, 1840.

Cryptochilus Rafinesque, 1815, Analyse de la nature . . . , p. 125 (Emendation).
Adonta Billberg, 1820, Enumeratio insectorum . . . , p. 101 (New name for *Salius*).
Stenoclavelia Arnold, 1932, Ann. Transvaal Mus., vol. 15, p. 44. Type: *Stenoclavelia mirabilis* Arnold; original designation.
Chilochares Banks, 1941, Canadian Ent., vol. 73, pp. 119, 120. Type: (*Cryptocheilus birkmanni* Banks) = *idoneum birkmanni* Banks; original designation.
Adirostes Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 465. Type: *Adirostes tolteca* Banks; original designation.

Medium sized species, or sometimes rather large, of average stoutness, the Nearctic species with forewing 6 to 14 mm. long; clypeus medium or rather large, convex; pronotum moderately long, its hind margin arcuate or somewhat angled at the middle; second intercubital vein straight or somewhat curved; second recurrent vein reaching the second cubital cell near or somewhat beyond its middle; cubital vein reaching wing margin; base of first discoidal cell without a distinct irregularity in the membrane; nervulus beyond basal vein by about 0.25 to 0.5 its length; nervellus ending basad of juncture of cubitella with discoidella; anal lobe about 0.65 as long as submediella (pl. 1, fig. 6); hind tibia with a dorsal serration, weaker in the male; brush on inner side of hind tibia in the Nearctic species rather narrow and with a subapical interruption; under side of hind tarsus of male with a close fringe of hairs extending from its base to beyond the middle (this fringe is absent in all other Nearctic Pepsinae except *Priocnemioides.*); last tarsal segment with two regular rows of bristles beneath; tooth on tarsal claws erect, acute.

The Nearctic species of *Cryptocheilus* are all closely related. In the Old World the genus is very much larger and with a structural diversity that poses problems in generic distinctions from other complexes of species. The males of certain Old World species have the thorax, especially the pronotum, elongate. The name *Stenoclavelia* was proposed for such males.

Keys to the Nearctic species of Cryptocheilus

MALES

1. Flagellum entirely orange, or its basal segment partly fuscous; body pubescence dark gray; wings largely orange 2
Flagellum entirely blackish; body pubescence blackish 3
2. Median apical notch on sixth sternite about 0.5 as deep as wide; apical margin of clypeus weakly concave; subgenital plate rather short.
3. **pallidipenne** (Banks)
Median apical notch on sixth sternite about 1.2 as deep as wide; apical margin of clypeus weakly convex; subgenital plate elongate.
4. **attenuatum** Banks

3. Median longitudinal ridge on subgenital plate narrow throughout; clypeus in front view with its apex truncate or weakly concave, or convex 4
Median longitudinal ridge on subgenital plate very broad basally; clypeus in front view with its apex strongly notched, either very broadly or rather narrowly 6
4. Median longitudinal ridge on subgenital plate with rather dense black hairs; wings black . . . . 1. **hesperus** (Banks)
Median longitudinal ridge on subgenital plate without hairs that are dense or denser than on the rest of its surface; wings blackish or largely yellow. SUBSPECIES OF TERMINATUM 5
5. Wings entirely black . . . . . . 2a. **terminatum subopacum** (Cresson)
Wings yellow, their apices broadly blackish. 2b. **terminatum terminatum** (Say)
6. Clypeus with a rather deep, U-shaped apical notch; longitudinal raised area on subgenital plate lanceolate, flat above and with sharp edges. 5. **severini** Banks
Clypeus with a broad shallow apical emargination; longitudinal raised area on subgenital plate elongate triangular, without sharp edges. SUBSPECIES OF IDONEUM 7
7. Wings entirely black . . . . 6a. **idoneum idoneum** Banks
Wings yellow, their apices blackish . . . . 6b. **idoneum birkmanni** Banks

FEMALES

1. Flagellum entirely orange, or its basal segment partly fuscous; wings largely orange; body pubescence dark gray 2
Flagellum entirely blackish; body pubescence blackish 3
2. Mandible, when not worn, about 0.75 as long as the extreme width of the clypeus; apex of mandible not unusually broad; clypeus a little shorter and a little more strongly convex; range: Arizona and California. 3. **pallidipenne** (Banks)
Mandible, when not worn, about 0.85 as long as the extreme width of the clypeus; apex of mandible broad; clypeus a little longer and a little less convex; range: Tennessee, Louisiana, Texas, and Iowa . 4. **attenuatum** Banks
3. Propodeum and metapleuron with close sharp transverse or oblique wrinkles; wings black; range: California, Oregon, Utah, and Nevada. 1. **hesperus** (Banks)
Propodeum and metapleuron smooth or with fine weak wrinkles 4
4. Apical margin of clypeus rather strongly concave; wings yellow, the apex of the forewing rather broadly black . . . . 5. **severini** Banks
Apical margin of clypeus less strongly concave; wings black or yellow with the apex of the forewing black 5
5. Lower lateral corner of face with a dusky stramineous mark; clypeus in profile less convex. SUBSPECIES OF IDONEUM 6
Lower lateral corner of face without a pale mark; clypeus in profile more convex. SUBSPECIES OF TERMINATUM 7
6. Wings entirely black . . . . 6a. **idoneum idoneum** Banks
Wings yellow, the apex of the forewing blackish. 6b. **idoneum birkmanni** Banks
7. Wings entirely black . . . . 2a. **terminatum subopacum** (Cresson)
Wings yellow, infuscate apically . . . 2b. **terminatum terminatum** (Say)

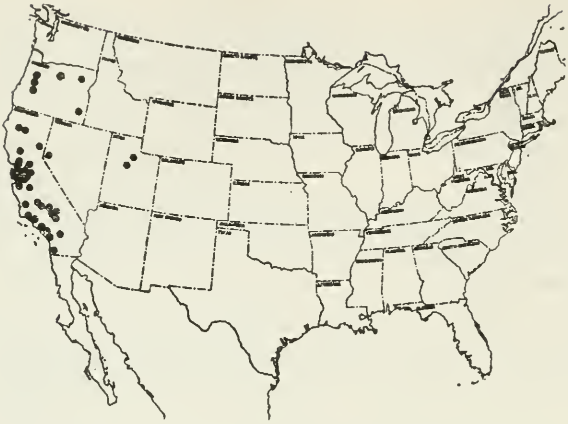


FIGURE 31.—Localities for *Cryptocheilus hesperus.*

1. *Cryptocheilus hesperus* (Banks)

Priocnemis hesperus Banks, 1915, Canadian Ent., vol. 47, p. 401, [♀]. Type: ♀, Stanford University, Calif. (Cambridge).

Cryptocheilus atratus Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 247, ♂, ♀. Type: ♀, Glenwood, Calif. (Ithaca).

MALE: Forewing 6 to 8.5 mm. long; front view of clypeus with the apex weakly arcuately concave; median notch of sixth sternite deeply V-shaped with the bottom rounded; subgenital plate tongue-shaped, with a median longitudinal rounded ridge that is stronger basally and gradually weaker to the apex, the longitudinal ridge with a crest of short, dense black hairs; margin of subgenital plate with a fringe of short, dense black hairs and bristles. Colored as in the female.

FEMALE: Forewing 6 to 12.5 mm. long; clypeus in side view strongly convex, in front view with the apex strongly and broadly arcuately concave; mandible (when not eroded) about 0.85 as long as the clypeus is wide, its apical tooth rather broad; propodeum and upper part of metapleuron with close, sharp, transverse wrinkles (without or with a few indistinct wrinkles in the male and in both sexes of the other Nearctic *Cryptocheilus*).

Black. Body pubescence blackish; wings blackish, the apical 0.23 ± of the forewing and the apex of the hind wing deeper black.

This species is very closely related to *C. terminatum*, differing in the possession of median crest of hair on the male subgenital plate and in having the female propodeum and metapleuron transversely wrinkled.

SPECIMENS (26♂, 100♀): From California (Alameda County, Antioch, Atascadero, Benicia, Berkeley, Cajon Pass in San Bernardino County, Chile Bar in Eldorado County, Clayton, Concord, Davis Creek in Modoc County, Dixon, Dos Palos, Eldridge in Sonoma County, Felton, Harris, Laguna Beach, La Jolla, Lemoncove, Lindsay, Oroville, Patterson, Pinoche in Fresno County, Placerville, Priest Valley at 2,300 ft. in Monterey County, Quincy, Redwood City, Redwood Creek, Richardson Springs, San Mateo County, San Francisco County, Santa Barbara, Santa Paula, Stanford University, Tracy, Wood Lake in Tulare County, and Ventura); Nevada (Reno); Oregon (Corvallis, Dufur, La Grande, Lane Benton Park 20 miles south of Corvallis, Malheur County, Pee Dee, and Yoncalla); and Utah (Fair West, Salt Lake, and Tooele).

Collection dates are mostly in June, July, August, and September. Dates outside of these four months are: Apr. 15 at Ventura, Calif.; May 7 at San Andreas Lake, San Mateo County, Calif.; May 10 at Clayton, Calif.; May 15 at Pinoche, Fresno County, Calif.; May 19 at Richardson Springs, Calif.; May 20 at Felton, Calif.; May 26 at Wood Lake, Tulare County, Calif.; Oct. 2 at Concord, Calif.; Oct. 13 at Antioch, Calif.; Oct. 15 at Telsa, Alameda County, Calif.; and October at Green Valley, Solano County, Calif. Flower records comprise *Cleome serrulata* and *Baccharis*.

This species has been collected commonly in California and Oregon and sparingly in Nevada and Utah. Adults are on the wing during the warmer part of the season.

2. *Cryptocheilus terminatum* (Say)

MALE: Forewing 6 to 8.5 mm. long; front view of clypeus with the apex weakly arcuately concave; median notch of sixth sternite deeply V-shaped with the bottom sharp; subgenital plate tongue-shaped, with a weak median longitudinal rounded ridge that is stronger basally and gradually weaker to the apex, the longitudinal ridge without a crest of hairs; margin of subgenital plate with a fringe of short straight and longer curved black hairs. Coloration as in the female.

FEMALE: Forewing 7.5 to 10 mm. long; clypeus in side view rather strongly convex, in front view with the apex strongly and broadly arcuately concave; mandible (when not eroded) about 0.80 as long as the clypeus is wide, its apical tooth moderately broad; propodeum without distinct wrinkles.

Black. Body pubescence blackish; wings either entirely blackish or largely orange-yellow, according to the subspecies.

There are two subspecies, differing only in wing color. It may be presumptuous to consider two forms subspecies without evidence of intergrades where their ranges approach, but with their ranges adjacent and only one character distinguishing the two populations, it seems reasonable to suppose that intergrades or other evidence of natural interbreeding will eventually come to view. An exactly similar situation occurs between the two forms here considered subspecies of *Cryptocheilus idoneum*.

2a. *Cryptocheilus terminatum subopacum* (Cresson)

Pompilus (*Priocnemis*) *subopacus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 114, ♂, ♀. Lectotype: ♀, Pennsylvania (Philadelphia).

Wings blackish, the apical 0.25± of the forewing and the apical margin of the hind wing deeper black.

Specimens: ♀, Washington, D. C., Sept. 5, 1948, D. Shappirio (Shappirio). ♂, Washington, D. C., Aug. 29, 1947, D. Shappirio (Shappirio). 2♀, Baldwin, Kans., July, Bridwell (Washington). 2♀, Marshall County, Kans., July 12 and 24, 1950, R. L. Fisher (Evans and Townes). ♀, Sheridan County, Kans., F. X. Williams (Washington). ♀, Glen Echo, Md., R. M. Fouts (Washington). ♀, Camden County, N. J., July 12, 1891 (Washington). ♀ (type), Pennsylvania (Philadelphia). ♂, Lobo, Tex., July 8, 1917 (Ithaca). 6♂, Dunn Loring (near Vienna), Va., July 18 and 31, 1948, July 24 and 30, and Aug. 6, 1949, K. V. Krombein (Krombein and Townes). 7♀, Dunn Loring, Va., June 26, 1949, July 18, 1948, July 27, 1947, Aug. 2, 1947, Aug. 21, 1949, and Aug. 22, 1948, K. V. Krombein (Krombein and Townes). ♂, Falls Church, Va., Aug. 30 (Cambridge). 4♀, Falls Church, Va., July 12, Aug. 30, Sept. 10 and 16, N. Banks (Cambridge).

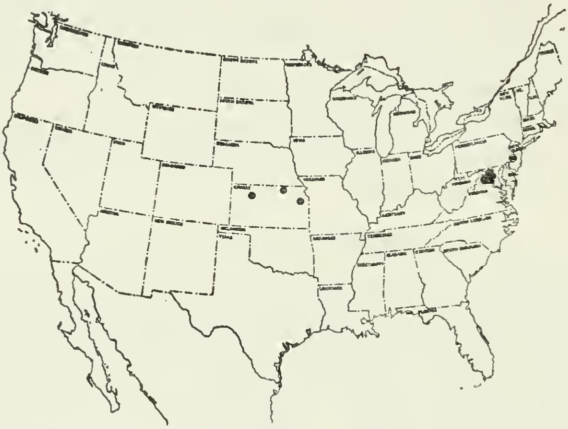


Figure 32.—Localities for *Cryptocheilus terminatum subopacum.*

This subspecies has been collected in the vicinities of Washington and Philadelphia, in Kansas, and at Lobo, Tex. The recorded flight season is from June 26 to Sept. 16.

2b. *Cryptocheilus terminatum terminatum* (Say)

Plate 2, figure 20

Pompilus terminatus Say, 1828, American entomology vol. 3, p. 92 (Leconte edition, vol. 1, p. 92), ♀. Type: ♀, near Arkansaw River, 200 miles east of Rocky Mts. (destroyed).

Cryptocheilus carinatus Banks, 1926, Canadian Ent., vol. 58, p. 202, ♂. Type: ♂, Orman Dam, S. Dak. (Cambridge).

Wings orange-yellow, the apical 0.25± of the forewing and the apex of the hind wing blackish.

This subspecies is one of three species or subspecies of *Cryptocheilus* agreeing moderately well with Say's description and figure of *Pompilus terminatus* and all three plus others have been identified as *terminatus* by various workers. The present form is the only one with the apical dark area of the forewing as wide as described by Say and the name *terminatum* thus seems applicable to it alone.

SPECIMENS (30♂, 51♀): From Alberta (Lethbridge); Arizona (Flagstaff, McNary, Mormon Lake, Oak Creek Canyon at 6,000 ft., Santa Rita Mts., and Sunnyside Canyon in the Huachuca Mts.); British Columbia (Fort Steele); Colorado (Boulder, Clear Creek in Jefferson County at 6,000 to 7,000 ft., Home, and Owl Canyon in Larimer County); Kansas (Cheyenne County, Gove County, Sherman County, Thomas County, and Wallace County); Minnesota (Argyle, Hallock, Kittson County, Lancaster, Ortonville, and Polk County); Montana; New Mexico (Raton); North Dakota (northeastern); South Dakota (Custer and Orman Dam); Texas (8 miles and 30 miles west of Fort Davis); Washington (Pullman); Wyoming (Chimney Rock); and México (Sombrerete in Zacatecas and Teotihuacán).

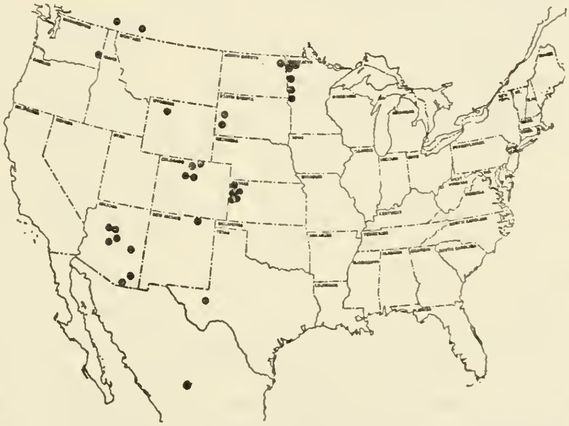


FIGURE 33.—Localities for *Cryptocheilus terminatum terminatum.*

Most collection dates are in July and August. Unusually early and late dates are: June 24 at Flagstaff, Ariz.; June 29 at Clear Creek, 6,000 to 7,000 ft., Jefferson County, Colo.; July 4 at 30 miles west of Fort Davis, Tex.; July 9 in Sunnyside Canyon, Huachuca Mts., Ariz.; Aug. 26 at Lancaster, Minn.; Aug. 27 at Home, Colo.; Sept. 7 at Argyle, Minn.; and Sept. 21 at Boulder, Colo.

This subspecies occurs in the Transition Zone of the Great Plains and the Rocky Mountain area. Adults are on the wing mostly in July and August.

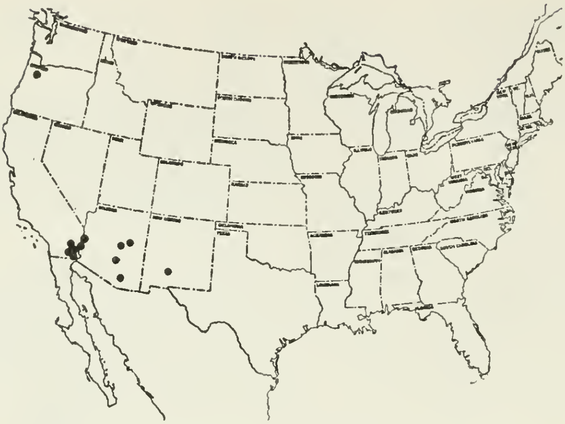


FIGURE 34.—Localities for *Cryptocheilus pallidipenne.*

3. *Cryptocheilus pallidipenne* (Banks)

Priocnemoides (!) *pallidipennis* Banks, 1911. Journ. New York Ent. Soc., vol. 19, p. 236, [♀]. Type: ♀, Tucson, Ariz. (Cambridge).

MALE: Forewing 8 to 9 mm. long; clypeus in front view with its apex moderately concave; median notch of sixth sternite deeply U-shaped; subgenital plate tongue-shaped, somewhat convex but without a median ridge; apical margin of subgenital plate with a fringe of short stout hairs. Coloration as in the female.

FEMALE: Forewing 8 to 10 mm. long; clypeus in side view rather strongly convex, in front view with the apex strongly and broadly arcuately concave; mandible (when not eroded) about 0.75 as long as the clypeus is wide, its apical tooth moderately broad.

Black. Body pubescence dark gray; flagellum orange, its first segment infuscate basally; wings orange-yellow, the apical 0.21 ± of the forewing and the apical margin of the hind wing fuscous.

SPECIMENS: ♀, Oak Creek Canyon, Ariz., July 9, 1941, R. H. Beamer (Lawrence). ♀, Tempe, Ariz., Aug. 15, D. K. Duncan (Krombein). ♀ (type), Tucson, Ariz., F. H. Snow (Cambridge). ♂, ♀, Tucson, Ariz., F. H. Snow (Townes). ♀, Walnut, Ariz., June 30, 1936, E. S. Ross (San Francisco). ♂, Blythe, Calif., May 19, 1947, E. G. Linsley (Berkeley). 4 ♂, Brawley, Calif., Aug. 9, 1914, J. C. Bradley (Ithaca and Cambridge). ♂, ♀, Calexico, Calif., August (Cambridge). 9 ♀, Imperial County, Calif., May and June, 1911, J. C. Bridwell (Washington). 5 ♂, Imperial County, Calif., April, May, and June, 1911, J. C. Bridwell (Washington). ♀, Ripley, Calif., Aug. 19, 1946, J. W. MacSwain (Berkeley). 2 ♀, Seeley, Calif., July 17, 1940, E. E. Kenaga (St. Paul and Lawrence).

♀, Mesilla, N. Mex., June 30, 1897, A. P. Morse (Washington). ♀, Corvallis, Oreg., July 12, 1925, D. A. Wilbur (Corvallis).

This species occurs in southern California, Arizona, New Mexico, and at Corvallis, Oreg.

4. *Cryptocheilus attenuatum* Banks

Cryptocheilus attenuatus Banks, 1933, Psyche, vol. 40, p. 8, ♂. Type: ♂, New Braunfels, Tex. (Cambridge).

Male: Forewing 7 to 8 mm. long; front view of clypeus with apex truncate or weakly concave; apex of sixth sternite semicircularly emarginate; subgenital plate tongue-shaped, somewhat narrowed apically, broadly tectate, the median longitudinal ridge with a crest of curved hairs; apical margin of subgenital plate with a fringe of long slender hairs, just dorsad of which is a fringe of short bristles. Coloration as in the female.

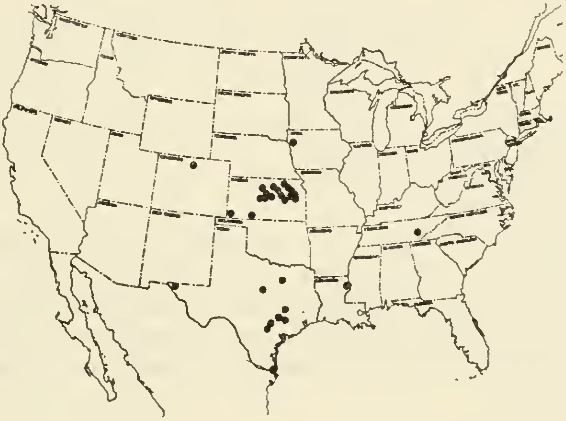


Figure 35.—Localities for *Cryptocheilus attenuatum*.

Female: Forewing 7.5 to 11 mm. long; clypeus in side view rather strongly convex, in front view with the apex moderately concave; mandible (when not eroded) about 0.85 as long as the width of the clypeus, its apical tooth very broad.

Black. Body pubescence dark gray; flagellum orange, its first segment somewhat infuscate basally; wings orange-yellow, the apical 0.18± of the forewing and the apex of the hind wing blackish.

Specimens (11♂, 52♀): From Colorado (Fort Collins); Iowa (Sergeant Bluff); Kansas (Baldwin, Carleton, Clay County, Clark County, Dickinson County, Ford County, Franklin County, Lawrence, Manhattan, Marshall County, Miami County, Morton County, Onaga, Osborne County, Rush County, Russell County, and Wabaunsee County); Louisiana (Tallulah); Tennessee (Knoxville); and Texas

(Bexar County, Brownsville, Camp Barkley in Taylor County, Dallas, El Paso, Maxwell, New Braunfels, San Marcos, and Williamson County); and México (Alpuyeca in Morelos and Villa Guadalupe in Jalisco).

Collection dates are rather evenly distributed from late spring to early fall, the earlier and later dates being April at Brownsville, Tex.; May 1, 5, and 13 in Bexar County, Tex.; Sept. 23 at Fort Collins, Colo.; Oct. 4 at Camp Barkley, Taylor County, Tex., and at Knoxville, Tenn.; Oct. 10 at Manhattan, Kans.; and Oct. 16 at Lawrence, Kans. Flower records comprise *Melilotus alba* and *Conium maculatum*. A female from Lawrence, Kans., was taken with prey, a juvenile *Lycosa*.

This species occurs from the Mississippi Valley to the Rocky Mountains in the Transition, Upper Austral, and Lower Austral Zones. It ranges further eastward than any other of the yellow winged pepsines. Adults occur throughout the warmer season.

5. *Cryptocheilus severini* Banks

FIGURE 1, *b*

Cryptocheilus severini Banks, 1926, Canadian Ent., vol. 58, p. 202, [♂]. Type: ♂, Newell, S. Dak. (Cambridge),
Cryptocheilus arizonicus Banks, 1933, Psyche, vol. 40, p. 7, ♂, ♀. Type: ♀, Tempe, Ariz. (Cambridge).

MALE: Forewing 8.5 to 10 mm. long; front view of clypeus with a deep semicircular emargination; sixth sternite with a shallowly U-shaped emargination; exposed portion subgenital plate about square, the apical angles rounded, basally with a median triangular elevation with flat top and sharp edges, the elevation reaching to or a

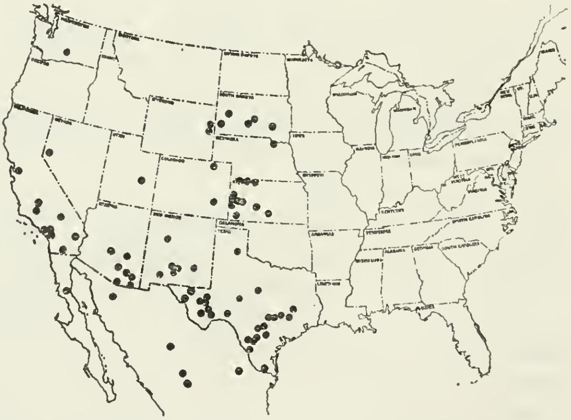


FIGURE 36.—Localities for *Cryptocheilus severini*.

little beyond the middle of the subgenital plate; apical margin of subgenital plate with a thin bare flange at the base of which is a row of short bristles. Coloration as in the female.

Female: Body pubescence blackish; forewing 7.5 to 14 mm. long; clypeus in profile moderately convex, in front view with the apex strongly concave; mandible about 0.85 as long as the clypeus is wide, its apical tooth rather narrow.

Black. Lower outer corners of face stramineous; wings orange-yellow, the apical 0.1± of the forewing and the apex of the hind wing blackish.

Specimens (59♂, 127♀): From Arizona (Douglas, Dragoon Mts., Nogales, Pearce, Phoenix, San Carlos, Tempe, and Tucson); California (Blythe, Calexico, Claremont, Coalinga, Dos Palos, Jacumba, Linsay, Los Angeles County, Redlands, San Antonio in Santa Clara County, Tejon, and Three Rivers); Colorado (Bent County, Clear Creek, and Logan County); Kansas (Decatur County, Greeley County, Hamilton County, Morton County, Norton County, Rawlins County, Scott City, Stafford County, Wallace, and Wichita County); Nebraska (Butte); Nevada (Reno); New Mexico (Deming, Hope, Magdalena, Mesquite, Mesilla Park, Organ, and Road Forks in Grant County); South Dakota (Capa, Custer, Newell, Pierre, and Platte); Texas (Alpine, Atascosa County, Balmorhea Lake in Reeves County, Bastrop County, Camp Barkley in Taylor County, Clarendon, College Station, Cornudas in Hudspeth County, Corrizo Springs, Cotulla, Dunlay, Fedor, Fort Davis, Frio State Park in Frio County, Hidalgo County, Juno, Laredo, Liberty Hill, Llano County, Marfa, Marathon and Pine Springs); Utah (Emery County); Washington (Lone Tree on the Yakima River); Wyoming (Newcastle and Weston County); and México (Canutillo in Durango, Jiménez in Chihuahua, and Vallecillo in Nueva León).

Most dates of capture are in the summer months, though in the southern parts of the range are many records for May, September, and October. Early and late dates of interest are; May 2 at Scott City, Kans.; May 11 at Cotulla, Tex.; May 12 at San Carlos, Ariz; May 13 at Laredo, Tex.; June 30 at Lone Tree on the Yakima River, Wash.; June 24 at Butte, Nebr.; June 28 at Newell, S. Dak.; Sept. 8 at Platte, S. Dak., Oct. 10 at Camp Barkley, Taylor County, Tex.; Oct. 17 in Atascosa County, Tex.; and Oct. 23 at Phoenix, Ariz. Flower records comprise *Monarda* and *Tamarix gallica*.

This species occurs from the hundredth meridian to the Rocky Mountains, in southern New Mexico, Arizona, and California, and in northern México. It is on the wing mostly in July and August in the northern part of its range, and from May to October in the south.

6. *Cryptocheilus idoneum* Banks

MALE: Forewing 7.5 to 9.5 mm. long; apex of clypeus with the middle half truncate, projecting laterad of the truncation as a short lobe; median notch of sixth sternite broadly U-shaped with a rounded bottom; subgenital plate with a median longitudinal raised triangular area having an attenuate point reaching to the apex, the sides of the raised areas distinct but not sharp; apical margin of subgenital plate truncate or somewhat retuse, with a fringe of short stout setae. Coloration as in the female.

FEMALE: Forewing 9 to 13.5 mm. long; clypeus in side view flatter than in the other Nearctic species of the genus, in front view with the apex rather strongly, arcuately concave; mandible (when not eroded) about 0.95 as long as the clypeus is wide, its apical tooth rather broad.

Black. Body pubescence blackish; lower corners of face dusky stramineous; wings blackish or largely orange-yellow, according to the subspecies.

There are two subspecies, differing only in wing color. No intergrades between them are yet known and it may eventually develop that each should be considered a full species.

6a. *Cryptocheilus idoneum idoneum* Banks

Psammochares tenuicornis Banks, 1910, Psyche, vol. 17, p. 249, ♂ (name preoccupied). Type: ♂, Southern Pines, N. C. (Cambridge).

Cryptocheilus idoneus Banks, 1910, Psyche, vol. 17, p. 250, ♀. Type: ♀, Southern Pines, N. C. (Cambridge).

Psammochares gracilicornis Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 225 (new name for *P. tenuicornis*).

Wings blackish, the apical 0.16± of the forewing deeper black.

SPECIMENS (10♂, 30♀): From Florida (Branford, Bristol Road in Gladsen County, Fort Lauderdale, Marineland, Myakka River State

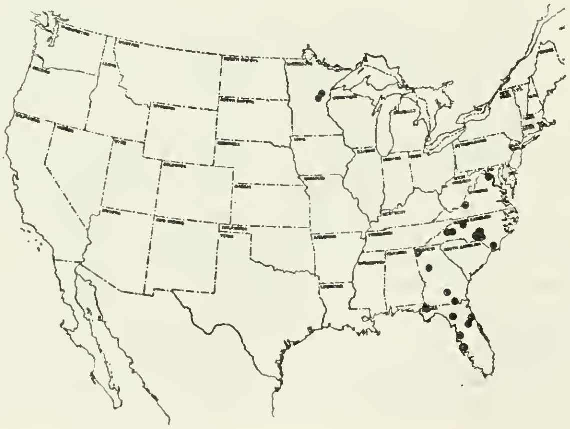


FIGURE 37.—Localities for *Cryptocheilus idoneum idoneum.*

Park, Orlando, and Weekiwatchee Springs in Hernando County); Georgia (Billys Island in the Okefenokee Swamp, College Park, Head River, and Tifton); Minnesota (Anoka County and Rice Creek in Anoka County); North Carolina (Lake Waccamaw, Laurel Hill, Oteen, Raleigh, Southern Pines, Swannanoa, and Winston); and Virginia (Clifton and Falls Church).

Dates of capture are distributed through the warmer part of the year, unusually early and late dates being: Apr. 2 and 17 at Orlando, Fla.; June 2 at Laurel Hill, N. C.; June 29 at Raleigh, N. C.; June 30 at Clifton, Va.; Sept. 3 at Swannanoa, N. C.; Sept. 20 at Lake Waccamaw, N. C.; early October at Raleigh, N. C.; and Oct. 15 in Virginia.

This subspecies has been collected from Virginia to Florida and in Minnesota. Adults occur during the summer and early fall.

6b. *Cryptocheilus idoneum birkmanni* Banks

PLATE 1, FIGURE 6

Cryptocheilus birkmanni Banks, 1926, Canadian Ent. vol. 58, p. 202, ♂, ♀. Type: ♂, Fedor, Lee County, Tex. (Cambridge).

Wings orange-yellow, the apical 0.16± of the forewing blackish and the tip of the hind wing infuscate.

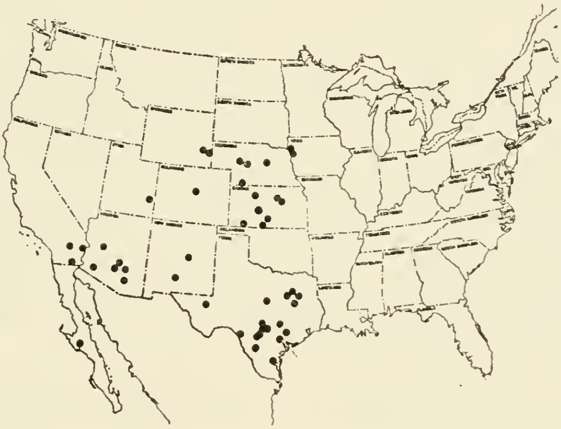


FIGURE 38.—Localities for *Cryptocheilus idoneum birkmanni.*

SPECIMENS (32♂, 64♀): From Arizona (Congress Junction, Florence, Mesa, Quijotoa in Pima County, Tempe, and Tucson); California (Palm Springs, Ripley, and Westmorland); Colorado (Roggen); Iowa (Sergeant Bluff and Sioux City); Kansas (Barber County, Barton County, Clay County, Reno County, Riley County, Rooks County, and Seward County); Nebraska (Bartley, Halsey, Meadow Grove, and Thedford); New Mexico (Aden, Kenna, Koehler, Las Cruces, Mesilla Park, and Santa Rosa); Texas (Athens, Austin, Carrizo Springs, Colorado County, Corpus Christi, Culberson

County, Cypress Mills, Dallas, Del Rio, Fedor, Galveston, Gillett in Karnes County, Llano County, Lytle, Mineola, Ranger, Rock Island, Rosser, San Antonio, Victoria, and Wilson County); Utah (Moab); Wyoming (Lingle and Torrington); and México, Baja California (El Arco Mine, Hamilton Ranch, 20 miles north of Mesquival, and San Ignacio).

Collection dates are rather evenly distributed through the warm months. The extreme dates are Apr. 17 at Corpus Christi, Tex., and Oct. 1 at Mineola, Tex. Flower records comprise *Stillingia sylvatica* and *Monarda* sp.

This subspecies ranges from the Western border of Iowa and all but easternmost Texas to Wyoming, Arizona, southern California, and Baja California. Adults occur during the warmer months.

Genus *Priocnemis* Schiødte

Medium or small sized species of slender to stout build, the forewing of the Nearctic species 3 to 13 mm. long; clypeus rather small for the Pepsini; pronotum of moderate length, its hind margin broadly angled to a weak median notch; second intercubital vein strongly curved and oblique posteriorly, nearly straight and perpendicular anteriorly; second recurrent vein reaching second cubital cell near its middle; cubital vein often fading out before the wing margin; base of first discoidal cell without an irregularity in the membrane; nervulus beyond basal vein by about 0.7 to 1.3 its length; nervellus ending some distance before juncture of cubitella with discoidella; anal lobe elliptical, about 0.35 to 0.55 as long as submediella (pl. 1, fig. 7); hind tibia either smooth or serrate dorsally, always serrate in females of the Nearctic species; brush on inner side of hind tibia of moderate width, without a subapical constriction; last segment of tarsi beneath without preapical bristles in the Nearctic species, in some exotic species with a few, rather irregularly rowed bristles; tooth on tarsal claws small, erect, acute.

This genus is mostly Holarctic, but the subgenus *Sphictostethus* has a marsupial type of distribution. The four recognized subgenera are keyed out below.

Key to the subgenera of Priocnemis

1. Wings reduced, not large enough for flying 2
   Wings of normal size 3
2. Thorax constricted at the middle; teeth on hind tibia weak, tuberclelike; Chilean species . . . . **Sphictostethus** (some females) (p. 81)
   Thorax not constricted at the middle; teeth on hind tibia chevron-shaped; Nearctic species . . . . **Priocnemis** (some females) (p. 89)

3. Propodeum with a strong sublateral longitudinal impression extending from the spiracle towards the apex; cubital vein evanescent just beyond the third cubital cell; third cubital cell about 1.7 as long as the second cubital cell; oriental species . . . . **Clistoderes** (p.83)
   Propodeum without a distinct sublateral longitudinal impression; cubital vein usually reaching the wing margin; third cubital cell less than 1.5 as long as the second cubital cell 4
4. Outer hind corner of third cubital cell obtuse or approximately rectangular (pl. 2, figs. 22, 23, 24, 25); hind tibia of male without teeth; hind tibia of female with low, chevron-shaped teeth . . . **Prioenemis** (in part) (p. 89)
   Outer hind corner of third cubital cell acute (pl. 1, fig. 7; pl. 2, fig. 21) . . . 5
5. Hind edge of hind tibia of female with the teeth sometimes moderately strong, but usually weak or obsolete, between the teeth (when these are present) the tibia is rather densely hairy; hind tibia of male lacking distinct teeth; species of marsupial-like distribution. The only Nearctic species has the wings mostly orange . . . . **Sphictostethus** (in part) (p. 81)
   Hind edge of hind tibia of female with the teeth strong, between the teeth the tibia polished and relatively or quite hairless; outer side of hind tibia of male with distinct teeth . . . . **Priocnemissus** (p. 83)

Subgenus *Sphictostethus* Kohl

Sphictostethus Kohl, 1884, Verh. zool.-bot. Ges. Wien, vol. 34, pp. 37, 47. Type: *Pompilus gravesii* Haliday; original designation.

Haploneura Kohl, 1884, Verh. zool.-bot. Ges. Wien, vol. 34, pp. 37, 47 (preoccupied; new synonymy). Type: *Haploneura apogona* Kohl; original designation.

Haploneurion Kohl, 1885, Ent. Nachr., vol. 11, p. 163 (new name for *Haploneura*).

In specimens with functional wings, the third intercubital vein slants outward so that the third cubital cell has its outer angle acute (pl. 2, fig. 21); the third cubital cell is variable in size, usually about 1.2 as long as the second, and the cubital vein usually reaches the wing margin. The wings of the females of some species are reduced, and in these species there are various distortions from the normal venation, including loss of the first intercubital vein. Upper edge of hind tibia of both sexes without or with teeth, the teeth when present usually weak, and never strong in the male; clothing hairs on upper edge of hind tibia not more sparse than on the front face of the tibia; propodeum without a sublateral longitudinal impression; male subgenital plate often with a longitudinal compressed tooth.

I have seen a number of species from Chile, some from New Zealand, one from Fiji, one from New Caledonia, five from México, and one from the Nearctic region. The Nearctic species (*P. pretiosa*) and the five from México form a distinct group which I shall call the *pretiosa* group. The determined extralimital species that have been examined are: *Pompilus gravesii* Haliday 1836; *Salius* (*Priocnemis*) *thaumastarius* Kohl 1905; *Pompilus flavipes* Guerin 1836; *Agenia xanthopus* Spinola 1851; *Haploneuria apogona* Kohl 1884; *Haploneurion* *minus* Kohl 1905; and *Priocnemis montrouzieri* Williams 1945. A paratype of *montrouzieri* has been examined. All these species except the New Caledonian *montrouzieri* are from Chile and all are new combinations in the genus *Priocnemis* or in the subgenus *Sphictostethus*, or in both.

***Priocnemis* (*Sphictostethus*) *pretiosa* Banks, new combination**

PLATE 2, FIGURE 21

Priocnemis pretiosa Banks, 1933, Psyche, vol. 40, p. 13, ♂. Type: ♂, Mount Lemmon at 6,000 ft., Santa Catalina Mts., Ariz. (Cambridge).

MALE: Forewing 6.5 to 10 mm. long; hind edge of hind tibia with feeble teeth; subgenital plate tongue-shaped, flat with its edge weakly reflexed, its surface with erect hairs averaging about 0.7 as long as the width of the subgenital plate, the more posterior hairs longer than the rest.

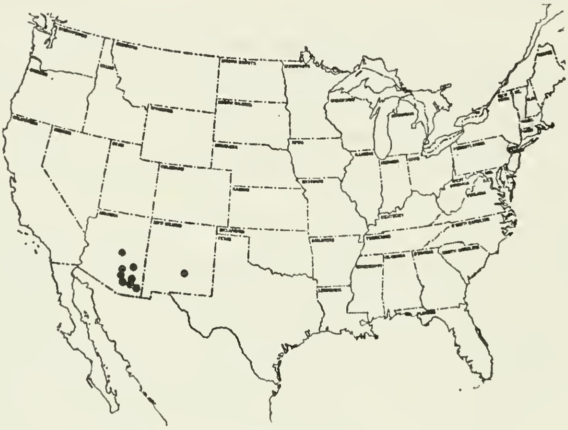


FIGURE 39.—Localities for *Priocnemis pretiosa.*

Black. Wings orange, their apices margined with fuscous. Smaller males have an additional, more or less well developed fuscous cloud centering just beyond the apex of the stigma.

FEMALE: Forewing 7.5 to 11 mm. long; hind edge of hind tibia with moderately strong teeth.

Black. Wings orange, the apex of the forewing margined with fuscous.

Two undetermined species from Mount Popocatépetl, México (9,600 ft.), are very close to *pretiosa*, differing only in minor characters in the male subgenital plate and lacking the discal cloud in the forewing of the male. One of the two may prove to be a subspecies of *pretiosa*.

SPECIMENS: 4♀, Carr Canyon, 7,500 ft., Huachuca Mts., Ariz., July 29, 1948, H. E. Evans (Evans). ♀, Cochise County, Ariz., July 31, 1916, V. Owen (San Francisco). ♀, Flys Peak, Chiricahua Mts., Ariz., July 1927, J. A. Kusche (San Francisco). ♂, on flowers of *Lomatium*, Graham Mts., Ariz., June 23, 1950 (Washington). ♂ (type), Mount Lemmon at 6,000 ft., Ariz., July 27, 1917 (Cambridge). ♂, 2♀, on forest floor, Mount Lemmon at 9,000 ft., Santa Catalina Mts., Ariz., Aug. 2 to 4, 1948, H. E. Evans (Evans). ♂, Oak Creek Canyon, Ariz., July 15, 1947, L. D. Beamer (Lawrence). ♂, 7♀, Rustlers Park at 9,000 ft. in the Chiricahua Mts., Ariz., July 7 to 8, 1948, H. E. Evans (Evans and Townes). ♀, Santa Rita Mts. at 5,000 ft., Ariz., Sept. 10, 1931, E. R. Tinkham (St. Paul). 2♂, 1♀, on forest floor, Cloudcroft at 9,000 ft., N. Mex., July 26, 1948, H. E. Evans (Evans and Townes). ♀, Cloudcroft at 9,100 ft., N. Mex., Aug. 1947, B. Valentine (Townes). ♀, "Meadow Valley," Sierra Madre, México, C. H. T. Townsend (Washington). One of the females from Rustlers Park was taken from under the bark of a log, chewing on the legs of a spider (a juvenile *Lycosa*). All the spider's legs had been cut off one side.

This species occurs at 5,000 to 9,100 ft. in the mountains of New Mexico, Arizona, and adjacent México.

Subgenus *Clistoderes* Banks

Clistoderes Banks, 1934, Proc. Amer. Acad. Arts Sci., vol. 69, p. 33. Type: *Priocnemis* (*Clistoderes*) *astarte* Banks; original designation.

This subgenus contains three species described from the Philippines by Banks in 1934. The long third cubital cell, sublateral grooves on the propodeum, and failure of the cubital vein to reach the wing margin are its outstanding characters.

Subgenus *Priocnemissus* Haupt

Priocnemissus Haupt, 1949, Beiträge zur taxonomischen Zoologie, vol. 1, p. 75. Type: *Procnemis* "*coriarius*" Dahlbom = *coriaceus* Dahlbom; original designation.

In the groove between the mesoscutum and scutellum slender slightly elevated wedges extend mesad but do not meet medially; third intercubital vein slanting outward so that the third cubital cell has its outer hind angle acute; third cubital cell about 1.2 as long as the second cubital cell; cubital vein reaching the wing margin (pl. 1, fig. 7); wings of both sexes functional; hind tibia of male with distinct teeth on its upper edge, of the female with strong, suberect, lobelike teeth; hind tibia of female almost hairless between the teeth so that its upper edge appears polished; propodeum without a distinct sublateral longitudinal impression.

This subgenus is well represented in Eurasia and has three species in North America. All three of these are adults in the spring, being among the first psammocharids to begin flying and the first to disappear as summer develops. The non-Nearctic species of this subgenus that have been studied are the Chilean *Salius* (*Priocnemis*) *dispertitius* Kohl 1905; the Colombian *Priophanes moesta* Banks 1945; and the European *Priocnemis mimulus* Wesmael 1851, *Sphex fusca* Fabricius 1775, and *Calicurgus vulgaris* Lepeletier 1845. These are all new combinations with the subgeneric name.

Key to the Nearctic species of the subgenus Priocnemissus

1. Abdomen black; male with apex of clypeus strongly concave; rather slender species . . . . 1. **minorata** Banks
   Abdomen largely or entirely red (rarely almost all black); male with apex of clypeus truncate; stout species 2
2. Abdomen black apically; thorax and head of female partly dull ferruginous; male subgenital plate with the hairs about 0.6 as long as the width of the plate . . . . 2. **nigripes** (Cresson)
   Abdomen red to the apex (rarely almost entirely black); thorax and head of both sexes entirely black; male subgenital plate with the hairs about 1.3 as long as the width of the plate . . . . 3. **oregona** Banks

1. *Priocnemis* (*Priocnemissus*) *minorata* Banks, new combination

FIGURE 1,*c*; PLATE 1, FIGURE 7

Priocnemis conicus "Say," as misdetermined by authors.

Priocnemis minorata Banks, 1912, Canadian Ent., vol. 44, p. 197, [♀]. Lectotype: ♀, Great Falls, Va., April 20 (Cambridge).

MALE: Forewing 6 to 10 mm. long; clypeus rather flat, short, and with the apex arcuately emarginate; subgenital plate tongue-shaped with a broad shallow notch in its apex, its hairs erect with their apices curved backwards, or in the case of the apical bristles curved mesad, averaging about 0.8 as long as the width of the subgenital plate.

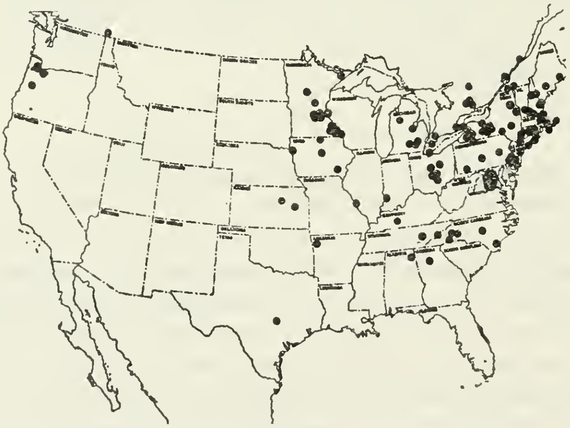


FIGURE 40.—Localities for *Priocnemis minorata.*

Black. Wings faintly to distinctly infuscate; abdomen black, but sometimes with a reddish tinge.

FEMALE: Forewing 7 to 12 mm. long.

Black. Wings lightly to strongly infuscate; abdomen black. Specimens from the Pacific States and British Columbia have the wings averaging a little darker than in specimens from the East.

This species is considerably more slender and with less long hair than the other two Nearctic species of the subgenus, and in these characters is more like a large group of Eurasian species.

Specimens (126♂, 309♀): From Alabama (De Soto State Park); Arkansas (Washington County); British Columbia (Creston and Pass Creek); Connecticut (Colebrook, Hartford, Lyme, and Wallingford); District of Columbia; Georgia (Burton and Yonah Mt.); Indiana (Vincennes); Iowa (Ames, Mount Pleasant, Sioux City, and Thompson); Kansas (Baldwin and Manhattan); Kentucky (Mammoth Cave National Park); Maine (Belgrade and Hancock); Maryland (Bowie, Cabin John, Glen Echo, Plummers Island, and Takoma Park); Massachusetts (Blue Hills, Cohasset, Dorchester, Lexington, Malden, Medford, Milton, Minot County, Nantucket, Provincetown, Sherborn, Wellesley, and Wollaston); Michigan (Ann Arbor, Jackson County, Midland County, Osceola County, and Portage Lake); Minnesota (Anoka County, Carver County, Fillmore County, Frontenac, Goodhue County, Hennepin County, Houston County, Itasca Park, Lake County, Lake Minnetonka, Manterville, Mille Lac, and St. Anthony Park); Missouri (St. Louis); New Hampshire (Durham, Hampton, Hanover, Jaffrey, Mount Monadnock, Ossipee, and Webster); New Jersey (Camden County, Lahaway in Ocean County, Malaga, Middlesex County, Pemberton, Princeton, and Trenton); New York (Buttermilk State Park, Cayuta Lake, Chafee, Connecticut Hill in Tompkins County, Heart Lake in Essex County, Honeoye Lake, Ithaca, Lancaster, McLean, Mahopac Falls, Oswego, Owego, Patterson, Plateau Mt. in the Catskills, Putnam, Sea Cliff, Slaterville, Smithtown, Syracuse, Taughanic Falls, and Yonkers); North Carolina (Asheville, Elizabethtown, Glenville, Marion, and Raleigh); Nova Scotia (Millsville); Ohio (Akron, Columbus, Delaware County, Lick County, Put in Bay, and Sugar Grove); Ontario (Bells Corners, Constance Bay, Fisher Glen, Grimsby, Jordan, Leamington, Merrivale, Ottawa, and Spencerville); Oregon (Corvallis, Forest Grove, and Portland); Pennsylvania (Castle Rock, Glenside, Lawndale, Pittsburgh, Spring Brook, and State College); Quebec (Abbotsford, Aylmer, Gracefield, Granby, Ironsides, Kazubazua, Montreal, and Quebec); Tennessee (Knoxville); Texas (College Station); Vermont (Manchester); Virginia (Arlington, Barcroft, Chain Bridge, Chapahamswick Park, Dunn Loring, East Falls Church, Falls Church, Glencarlyn, Great Falls, Mount Vernon, and Vienna); and Wisconsin (St. Croix Falls).

Most collection dates are in April, May, and early June. Especially early and late dates are Mar. 24 at Washington, D. C.; Mar. 30 at Plummers Island, Md.; Mar. 31 at Cabin John, Md.; Apr. 1 at Glen

Echo, Md.; Apr. 3 in Brazos County, Tex.; Apr. 6 at Forest Grove, Oreg.; Apr. 9 at Ithaca, N. Y.; Apr. 24 at Owego, N. Y.; June 10 at Constance Bay, Ont.; June 11 at Fisher Glen and Leamington, Ontario, and in Lake County, Minn.; June 21 at Chafee, N. Y.; June 24 at Lyme, Conn.; June 27 at Ithaca, N. Y.; and June 29 in Itasca Park, Minn. Flower records include one collection on blueberry, three on *Benzoin aestivale*, and one on *Prunus serotina.* On two occasions specimens were taken at "sugar" put on tree trunks for collecting moths. Adults appear with the first spring flowers and disappear in early summer. The habitat is woods, usually in sun-warmed stream bottoms. The adults run or fly low over the forest floor, and lack of concealing foliage at this early season makes them conspicuous. Soon after the trees are in full leaf they begin to disappear.

This species occurs in the Alleghenian and Carolinian faunas of the eastern half of the continent, and in the Transition fauna of the Pacific Northwest. Its habitat is woods, the adults being present from early spring to early summer.

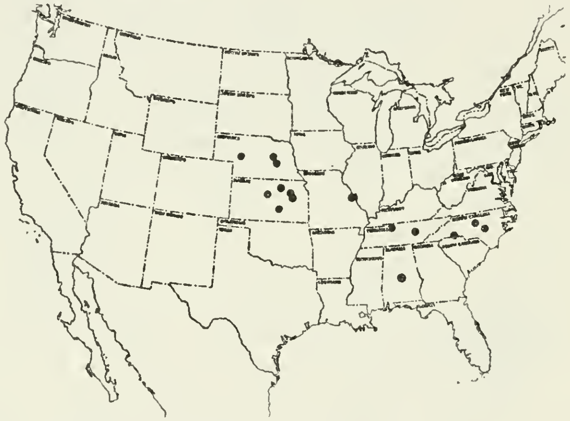


FIGURE 41.—Localities for *Priocnemis nigripes.*

2. *Priocnemis* (*Priocnemissus*) *nigripes* (Cresson), new combination

Pompilus (*Priocnemis*) *nigripes* Cresson, 1865, Proc. Ent. Soc. Philadelphia, vol. 4, p. 454, ♀. Type: ♀, Colorado (Philadelphia).

Priocnemis gomelza Brimley, 1934, Ent. News, vol. 45, p. 43, ♀. Type: ♀, Raleigh, N. C. (Raleigh).

MALE: Forewing 8 to 10 mm. long; clypeus weakly convex, its apex truncate; subgenital plate tongue-shaped, its hairs suberect and about 0.6 as long as the width of the subgenital plate.

Black. Wings lightly infuscate; most of second tergite, apical half of the first tergite, and basal half of third tergite ferruginous, the rest of the abdomen black.

FEMALE: Forewing 9 to 12 mm. long.

Black. Most of head and thorax dull ferruginous with the sutures black; coxae with an external dull ferruginous area; wings moderately infuscate, the forewing a little darker along the basal vein and nervulus and in an area just beyond the level of the stigma; abdomen ferruginous, infuscate beyond the third tergite, the apical margins of the first to third tergites usually weakly infuscate; base of first tergite somewhat infuscate.

SPECIMENS (3♂, 45♀): From Alabama (Montgomery): Arkansas (Palm); Colorado; Kansas (Baldwin County, Douglas County, Ellsworth, Manhattan, and Wichita); Missouri (St. Louis); Nebraska (Lincoln and Malcolm); North Carolina (Chapel Hill, Raleigh, and Tryon); and Tennessee (Clarksville and Knoxville). The 3 males were collected on Mar. 4 and 16 at Manhattan, Kans., and on Mar. 30 at Lincoln, Nebr. Dates of capture for females are from Mar. 8 to May 2, one from Malcolm, Nebr., on May 12, and one from Osage, Kans., in "August." Most were collected in April.

This is a species of the Central and Southeastern States. Adults occur in early spring.

3. *Priocnemis (Priocnemissus) oregona* Banks, new combination

Pompilus comparatus Walker, 1866, *in* Lord, The naturalist in Vancouver Island and British Columbia, vol. 2, p. 341, ♀ (preoccupied). Type: ♀, British Columbia (London).

Priocnemis oregona Banks, 1933, Psyche, vol. 40, p. 11 (new name).

MALE: Forewing 6.5 to 11 mm. long; clypeus moderately convex, rather long, its apex truncate; subgenital plate tongue-shaped, its hairs erect and about 1.3 as long as the width of the subgenital plate.

Black. Wings moderately infuscate; abdomen red, the base of the first tergite black.

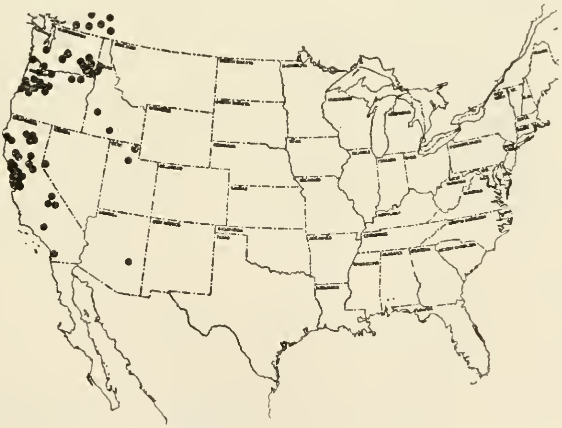


FIGURE 42.—Localities for *Priocnemis oregona*.

Female: Forewing 7.5 to 13 mm. long.

Black. Wings fuscous; abdomen red, the base of the first tergite black.

Variety: Four males and one female have the abdomen largely (the males) or entirely (the female) blackish, and may represent a distinct race. These are: ♂, Fairfax, Marin County, Calif., Apr. 12, 1925, C. L. Fox (Townes). ♂, Mill Valley, Marin County, Calif., Feb. 28, 1926 (San Francisco). ♀, Miat Canyon near Palmdale, Calif., Apr. 20, 1932, E. P. VanDuzee (San Francisco). ♂, Sonoma County, Calif., Feb. 20, 1911, J. A. Kusche (San Francisco). ♂, Yorkville, Calif., May 8, 1935, E. P. VanDuzee (Berkeley).

Specimens (typical variety; 28♂, 267♀): From Arizona (Parker Creek in the Sierra Ancha); British Columbia (Aspen Grove, Creston, Kaslo, Lavington, Penticton, Robson, Salmon Arm, and Vernon); California (Berkeley, Dutch Flat, Fairfax, Fish Camp, Glen Ellen, Hat Lake in Lassen National Park, Humboldt County, Inverness, Lake Pilarcitus in San Mateo County, Manzanita Lake in Lassen National Park, May Lake in Yosemite National Park, Miami Ranger Station in Mariposa County, Mill Valley, Mount Diablo in Contra Costa County, Mountain View, Nevada City, Old Station, Palmdale, Richardson Springs, Ross, Ryan Creek in Mendocino County, San Francisco, San Jose, Santa Clara County, Shasta County, southern Sonoma County, Smoky Jack Camp in Yosemite National Park, and Yorkville); Idaho (Boise, Burley, Cedar Mt. near Moscow, Moscow, Moscow Mt., and Potlatch); Nevada (Reno); Oregon (Alsea Mt., Astoria, Breitenbush, Corvallis, Drift Creek, Echo, Marion, Mosier, Oakville, Portland, Salem, Scio, Shaw, Toledo, Waldport, Wildhorse Mt. near Athena, and Wren); Utah (Logan and Salt Lake City); and Washington (Almota, Buena, Clarkston, Gilmer, Olympia, Palouse, Pullman, Ritzville, Spokane, Wawawai, and Wenatchee).

Most dates of collection are from Mar. 20 to June 6. At more northern latitudes or at higher altitudes the dates run somewhat later, and a few straggling females have been taken in August. Representative early and late dates are: Feb. 20 in southern Sonoma County, Calif.; Feb. 28 at Mill Valley, Calif.; Mar. 3 at Corvallis, Oreg.; Mar. 9 in Washington State; Mar. 10 at Berkeley, Calif.; Mar. 11 at Wren, Oreg.; Mar. 12 at Dutch Flat, Calif.; Mar. 16 at Reno, Nev.; Mar. 20 at Toledo, Oreg.; Mar. 25 at Spokane, Wash.; March 27 at Vernon, British Columbia; June 14, June 28, and Aug. 2 at Corvallis, Oreg., June 16 at Ryan Creek, Mendocino County, Calif.; June 24 at Cedar Mt., Moscow, Idaho; June 21 at 8,000 ft. and June 26 at 10,500 ft. in Yosemite National Park, Calif.; Aug. 10 and 16 at Echo, Oreg.; Aug. 16 at Toledo, Oreg.; November at San Francisco, Calif. (♀); and Dec. 16 in the hills back of Oakland, Calif. (2♂). The last date, and possibly the last two dates apparently represent precocious spring arrivals rather than late stragglers. A female collected Apr. 10, 1902, at Mountain View, Calif., is labeled "from nest of ground spider."

This is a spring species common in the Transition and Canadian faunas from southern British Columbia to southern California, and less common eastward into the Great Basin.

Subgenus *Priocnemis* Schiødte

Priocnemis Schiødte, 1837, Krøyer's Naturhistorisk Tidsskrift, vol. 1, p. 324. Type: *Sphex exaltata* Fabricius; designated by Westwood, 1840.

Prionocnemus Burmeister, 1872, Stettiner Ent. Zeitung, vol. 33, p. 235 (emendation).

Prionocnemis Kirby, 1884, Zool. Rec., vol. 20 (Insecta), p. 131 (emendation).

Myrmecosalius Ashmead, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 307 (new synonymy). Type: *Myrmecosalius nigriceps* Ashmead; monobasic.

In the groove between the mesoscutum and scutellum slender slightly elevated wedges extend mesad from each side and meet at the middle, forming a narrow raised transverse line; third intercubital vein approximately perpendicular so that the third cubital cell has its outer angle approximately rectangular or obtuse; third cubital cell about as long as the second cubital cell; cubital vein sometimes not reaching the wing margin (pl. 2, figs. 22, 23, 24, 25); wings of the females of some species reduced or vestigial; hind tibia of male without a trace of teeth on its outer edge, of female with a row of sharp, obliquely chevron-shaped, decumbent teeth; hind tibia of female with numerous hairs on and between its teeth, so that its outer edge does not appear polished; propodeum without a sublateral longitudinal impression.

This subgenus is well represented in both North America and in Eurasia, and there are a few species in the Neotropics. In contrast to the vernal subgenus *Priocnemissus*, adults of the subgenus *Priocnemis* occur in the summer. The extralimital species of which specimens have been studied are: *Pompilus parcus* Cresson 1867 (Cuba); the European *Sphex exaltata* Fabricius 1775, *Pompilus minutus* Linden 1827, *Pompilus femoralis* Dahlbom 1829, *Priocnemis parvulus* Dahlbom 1845, *Priocnemis obtusiventris* Schiødte 1837, *Pompilus pusillus* Schiødte 1837, *Calicurgus propinquus* Lepeletier 1845, and *Salius schenckii* Kohl 1884; an undetermined Chilean species; and two undetermined species from México related to *P. navajo*.

In 1951 (U. S. Dep. Agr., Agr. Monogr. No. 2, pp. 913–914) the subgeneric name *Priocnemis* was erroneously applied to *Priocnemissus* and true *Priocnemis* was called *Myrmecosalius*. The error originated with specimens of a European species of *Priocnemissus* misdetermined as *Priocnemis exaltata*, the genotype of *Priocnemis*, which gave a false idea of the proper application of this name.

The name *Hemipogonius* Saussure 1892, is sometimes listed as a synonym of *Priocnemis*. Its genotype has not been available for study.

Keys to the Nearctic species of the subgenus Priocnemis

MALES

(The male of *P. abbreviatus* is unknown.)

1. Subgenital plate with the hairs distributed evenly over its entire surface, usually broad 2
Subgenital plate with the hairs restricted to certain areas, narrow 7
2. Sixth sternite with a medium apical pair of parallel ridges (in addition to the usual lateral hooks); hair on subgenital plate long and suberect.
4. **hestia** (Banks)
Sixth sternite without a median apical pair of parallel ridges (with a pair of low convergent ridges in *P. aequalis*); hair on subgenital plate either short and depressed or long and recurved 3
3. Subgenital plate narrow, its exposed portion about 2.3 as long as wide; hair on subgenital plate long and strongly recurved; frons mat, not distinctly punctate . . . . 5. **cornica** (Say)
Subgenital plate broad, its exposed portion about 1.3 as long as wide; hair on subgenital plate depressed, rather short; frons mat to subpolished, with distinct punctures 4
4. Sixth sternite with a median apical pair of weak convergent ridges; punctures on frons weak, separated by about 1.0 to 2.0 their diameter.
3. **aequalis** (Banks)
Sixth sternite without a median pair of ridges; punctures on frons stronger, separated by about 0.3 to 1.0 their diameter 5
5. Apical margin of clypeus with a sublateral thickening, impression, or pit (the development of this structure is extremely variable); frons and pleura a little less polished . . . . 1. **germana** (Cresson)
Apical margin of clypeus sharp, unspecialized; frons and pleura a little more polished. SUBSPECIES OF SCITULA 6
6. Coxae black or blackish; femora and abdomen often without fulvous markings.
2a. **scitula relicta** Banks
Coxae largely or entirely fulvous; femora and abdomen largely fulvous.
2b. **scitula scitula** (Cresson)
7. Subgenital plate with a single median longitudinal row of long suberect setae, otherwise bare . . . . 6. **minuscula** (Banks)
Subgenital plate with hairs in patches, not with a single median row of setae. 8
8. Subgenital plate without a median erect tooth or a median pair of elongate tubercles; frons mat, indistinctly punctate . . . 8. **nigriceps** (Ashmead)
Subgenital plate with a median raised tooth or pair of elongate tubercles; frons subpolished, with sharp punctures. SUBSPECIES OF NOTHA . . . 9
9. Subgenital plate with a median pair of elongate tubercles or ridges; abdomen black 10
Subgenital plate with a median erect tooth or pair of teeth; abdomen with its basal half often rufous 11
10. Range: Upper Sonoran Zone of the Rocky Mountain area, westward to the Pacific . . . . 9a. **notha navajo** Banks

Range: Transition Zone of California, Oregon, Washington, and British Columbia . . . . 9b. **notha occidentis** Banks

11. Abdomen black with rufous stains on its basal half; tooth on subgenital plate longitudinally divided . . . . . . 9c. **notha alaskensis,** new subspecies

Abdomen with its basal half rufous; tooth on subgenital plate usually single. 9d. **notha notha** (Cresson)

FEMALES

1. Wings vestigial, too short to be functional 2

Wings not vestigial, functional 3

2. Forewing about 0.8 as long as the thorax; femora largely fuscous. 7. **abbreviatus,** new species

Forewing about 0.3 as long as the thorax; femora ferruginous. 8. **nigriceps** (Ashmead)

3. Apical half of forewing evenly infuscate 4

Apical half of forewing irregularly infuscate so as to appear faintly to distinctly banded or spotted 8

4. Frons and mesoscutum distinctly shiny, with distinct close punctures. SUBSPECIES OF NOTHA 5

Frons and mesoscutum dull, without distinct punctures . . 5. **cornica** (Say)

5. Abdomen entirely black; forewing more strongly infuscate. 9a. **notha navajo** Banks

Abdomen largely or entirely rufous; forewing moderately infuscate . . . 6

6. Abdomen entirely rufous . . . . 9b. **notha occidentis** Banks

Abdomen with its apical 0.3 to 0.6 black or blackish 7

7. Apical 0.6± of abdomen blackish . . 9c. **notha alaskensis,** new subspecies

Apical 0.35± of abdomen blackish . . . . 9d. **notha notha** (Cresson)

8. Pronotum fulvous, the rest of the thorax black; wings unusually narrow and short (pl. 2, fig. 25) . . . . 6. **minuscula** (Banks)

Pronotum black, or if pale then other parts of the thorax also pale; wings of normal width and length 9

9. Fourth cubital cell uniformly and lightly infuscate; frons mat but somewhat shining, with rather scattered shallow punctures . . 3. **aequalis** (Banks)

Fourth cubital cell with its basal 0.7 subhyaline and its apical 0.3 lightly infuscate so that the forewing has a conspicuous pale subapical spot; frons mat to polished, with closer deeper punctures or not obviously punctate 10

10. Frons dull, with close small punctures that are difficult to see so that it may appear mat and impunctate; forewing with a conspicuous fuscous mark over the basal vein and nervulus, the mark crossing the anal cell (pl. 2, fig. 24) . . . . 4. **hestia** (Banks)

Frons somewhat shining, obviously punctate; forewing with a weaker fuscous mark over the basal vein, the mark not invading the anal cell (pl. 2, figs. 22, 23) 11

11. Clypeus with a median weak transverse elevation just before the apex that gives the impression of a weak flattening just beyond the elevation; frons more densely punctate; frons and pleura more strongly mat; forewing 6 to 9 mm. long . . . . 1. **germana** (Cresson)

Clypeus without a median subapical irregularity; frons less densely punctate; frons and pleura less strongly mat; forewing 4 to 6 mm. long. SUBSPECIES OF SCITULA 12

12. Legs and body entirely or almost entirely black . 2a. **scitula relicta** Banks

Legs and body partly fulvous, at least the abdomen less than 0.75 black. 2b. **scitula scitula** (Cresson)

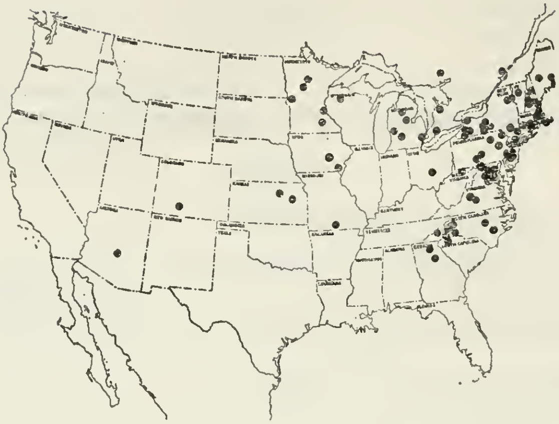


FIGURE 43.—Localities for *Priocnemis germana.*

1. ***Priocnemis (Priocnemis) germana*** (Cresson)

PLATE 2, FIGURE 22

Pompilus (Priocnemis) germanus Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 116, ♀. Lectotype: ♀, Delaware (Philadelphia).

Pompilus (Agenia) iridipennis Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 127, ♂. Lectotype: ♂, West Virginia (Philadelphia).

MALE: Forewing 4 to 7 mm. long; clypeus with the apical margin specialized, the specialization varying from a sublateral thickening or weak impression of the margin to a very large deep pit in the same position; frons subpolished, with sharp punctures separated by about 0.2 their diameter. The stronger specialization of the clypeus occurs usually in larger males. In these there is a tendency for the clypeus to be narrower than usual and the head is always swollen posterodorsally. In all other Nearctic species of this subgenus the apical margin of the clypeus is simple and sharp in both sexes and the head is of normal shape. Middle third of sixth sternite smooth; exposed part of subgenital plate tongue-shaped, about 1.3 as wide as long, covered with short oblique hairs.

Black. Apical half of mandible rufous; front tarsus and front side of front tibia usually fulvous; wings subhyaline, the apical third of the forewing weakly infuscate.

FEMALE: Forewing 6 to 10 mm. long; frons mat, with small very close punctures; clypeus with a weak, median, transverse, subapical swelling.

Black. Apical half of mandible rufous; wings subhyaline, the forewing with a narrow indefinite infuscation along the basal vein and its apical third moderately infuscate, with a conspicuous hyaline area covering the basal 0.7 of the fourth cubital cell; apex of hind wing weakly infuscate.

Specimens (242♂, 230♀): From Arizona (Oak Creek Canyon at 6,000 ft.); Colorado (Granite Peaks Camp near Bayfield at 9,000 ft.); Connecticut (East Hartford, Lyme, Salisbury, Soapstone Mt., and Stafford); Delaware; District of Columbia; Georgia (4,200 ft. on Tray Mt. in White County and Stone Mt.); Iowa (Iowa County and Mount Pleasant); Kansas (Baldwin and Riley County); Maine (Casco, Eagle Lake on Mount Desert Island, and Salisbury Cove); Maryland (Beltsville, Cabin John, Chevy Chase, Deep Creek Lake, Glen Echo, Patuxent River, Plummers Island, and Takoma Park); Massachusetts (Holliston, Lexington, Sherborn, and Woods Hole); Michigan (Detroit, Midland County, Muskegon County, Roscommon County and Schoolcrest County); Minnesota (Beltrami County, Fish Hatchery at St. Peter, Itasca Park, Traverse County, and Washington County); Missouri (Willow Springs); New Hampshire (Groton Township, Hampton, Merrimack County, Mount Washington, Pittsfield, and Stratford County); New Jersey (Bordentown, Moorestown, Ramsey, and Riverton); New York (Bemus Point, Enfield Glen in Tompkins County, Essex County, Gardiners Island, Gowanda, Ithaca, Little Valley, Mastic, McLean, New Russia, Niagara Falls, Oliverea, Putnam County, and Spring Lake in Cayuga County); North Carolina (Black Mt., Bryson City, Clinton, Crabtree Meadows at 3,600 ft. in Yancey County, Hamrick, Mount Mitchell, Mount Pisgah, and Wake County); Ohio (Sugar Grove); Ontario (Constance Bay, Gull Lake in the Muskoka District, Timagami, Toronto, and Waubamic); Quebec (Laniel and Montreal); South Carolina (Table Rock State Park); Vermont (Stowe); Virginia (Arlington, Chain Bridge, Dunn Loring, Falls Church, Glencarlyn, Great Falls, Rosslyn, and Skyline Drive); and West Virginia (Bolivar and Terra Alta).

Collection dates are mostly from June 1 to Sept. 15, with a conspicuous concentration in July and August and precocious and straggling individuals a few weeks outside of this range as: Apr. 16 at Takoma Park, Md.; Apr. 31 on the Patuxent River, Md.; May 13 at Falls Church, Va.; May 24 at Clinton, N. C.; May 26 at Cabin John, Md., and at Mount Pleasant, Iowa; May 30 at Bowie, Md.; Sept. 16 at Cabin John, Md., and at Washington, D. C.; Sept. 23 at Bolivar, W. Va.; Oct. 1 at Arlington, Va.; and Oct. 13 on Plummers Island, Md. North of the vicinity of Washington, D. C., the dates of collection do not extend so late into the fall, as indicated by the extreme dates of Sept. 8 at Englenook, Pa., and Sept. 14 at Philadelphia, Pa. Twelve of the collections are labeled as having been made in woods and my own experience is that the species occurs almost exclusively in the herbs and shrubbery of mesophytic and moist deciduous woods.

This species occurs in the Alleghenian and Carolinian faunas and there are a few scattered records for the Rocky Mountains. The habitat is the undergrowth of woods. Adults are commonest in July and August.

2. *Priocnemis (Priocnemis) scitula* (Cresson)

MALE: Forewing 3.5 to 5 mm. long; frons subpolished, with rather shallow punctures separated by about 0.7 their diameter; median third of sixth sternite with a pair of faintly raised, small apical mounds; exposed part of subgenital plate tongue-shaped, about 1.3 as long as wide, covered with short oblique hairs; mandible largely rufous; wings hyaline, the apical third of the forewing faintly infuscate.

FEMALE: Forewing 4.5 to 6 mm. long; frons subpolished, its punctures separated by about 0.3 their diameter. Mandible largely rufous; wings subhyaline, the forewing with a faint infuscation along the basal vein and its apical third moderately infuscate, with a conspicuous hyaline area covering the basal 0.7 of the fourth cubital cell (pl. 2, fig. 23); apex of hind wing faintly infuscate.

There are two weakly differentiated subspecies, a northern one (*relicta*) with the body and legs almost entirely black and a southern one (*scitula*) with the body and legs largely fulvous. Their colorations and distributions are described below.

2a. *Priocnemis (Priocnemis) scitula relicta* Banks

Priocnemis relicta Banks, 1912, Canadian Ent., vol. 44, p. 198, [♀]. Lectotype: ♀, Sea Cliff, N. Y., Sept. 5 to 10, N. Banks (Cambridge).

Ageniella tenella Banks, 1915, Canadian Ent., vol. 47, p. 400, ♂. Lectotype: ♂, Niagara Falls, N. Y., July 31, 1910, M. C. Van Duzee (Cambridge).

MALE: Black. Legs with a variable amount of fulvous, this covering at least the front tarsus and front tibia (which is infuscate above),

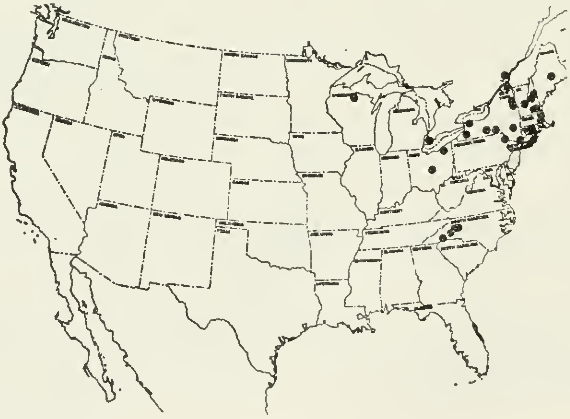


FIGURE 44.—Localities for *Priocnemis scitula relicta.*

and at most these parts plus almost all of the front femur and of the middle and hind femora and tibiae; basal half of abdomen usually stained with fulvous laterally.

Female: Black. Front tarsus, front of front tibia and often the basolateral parts of the abdomen stained with fulvous.

Specimens (16♂, 60♀): From Connecticut (East Hartford, Lyme, Orange, and Stafford); Maine (Orono); Massachusetts (Holliston and South Natick); New Hampshire (Greenfield, Pinkham Notch, Pittsfield, and Stinson Lake); New York (Big Indian Valley in the Catskill Mts., Boston, Cold Spring Harbor, Gardiners Island, Ithaca, Keene, New Russia, Niagara Falls, Oneonta, Poughkeepsie, Sea Cliff, and Van Courtland); North Carolina (Crabtree Meadows in Yancey County at 3,600 ft., Hamrick, Mount Mitchell at 5,200 ft., and Mount Pisgah at 4,600 ft.); Ohio (Columbus and Shaker Heights); Ontario (Chatham); Pennsylvania (Paupack); Quebec (Knowlton and Montreal); Vermont (Woodstock); and Wisconsin (Sawyer County).

Most dates of capture are from July 15 to Aug. 31. The extreme dates are June 15 to Sept. 10.

This subspecies occurs in the Canadian and Alleghenian faunas. The habitat is the undergrowth of moist woods. Adults are on the wing mostly in the last half of summer.

2b. *Priocnemis (Priocnemis) scitula scitula* (Cresson)

Plate 2, figure 23

Pompilus (Priocnemis) scitulus Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 118, ♀. Type: ♀, Illinois (Philadelphia).

Male: Black. Coxae below and sometimes almost entirely, trochanters except at the base, middle and hind femora except at the

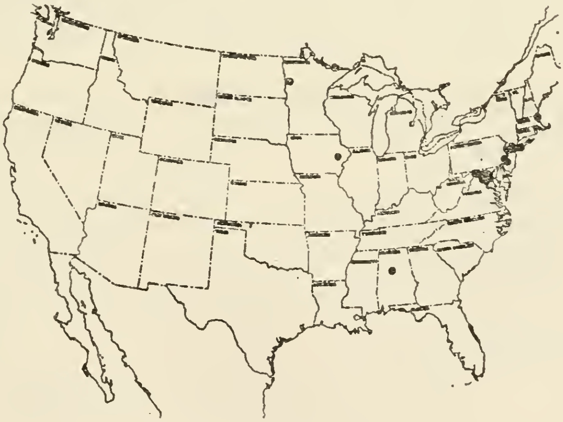


Figure 45.—Localities for *Priocnemis scitula scitula.*

apex, front tibia except for a weak dorsal infuscation, middle and hind tibia except toward their ends, front and middle tarsi, more or less of the posterolateral part of pronotum and sides and venter of basal half of abdomen, fulvous.

FEMALE: Black. Thorax varying from entirely black to almost entirely fulvous; legs fulvous, with more or less extensive infuscation, this infuscation usually covering upper side of the coxae, the hind knees, and the hind tarsi; abdomen fulvous with approximately the apical half black or infuscate.

SPECIMENS (28♂, 44♀): From Alabama (Coosa River in Chilton County); District of Columbia; Illinois; Iowa (Iowa City); Maryland (Bowie, Cabin John, Glen Echo, Plummers Island, and Takoma Park); Massachusetts (Wellesley); Minnesota (Norman County); New Jersey (Moorestown and West Englewood); New York (Sea Cliff); Pennsylvania (Inglenook, Overbrook, and Philadelphia); Virginia (Arlington, Falls Church, and Palonian Springs); and West Virginia (Bolivar).

Most dates of capture are from June 15 to Sept. 15. Those earlier and later are: May 28, June 1 and 11 at Falls Church, Va.; Sept. 21 at Iowa City, Iowa; Sept. 23 at Bolivar, W. Va.; Sept. 24 at Bowie, Md.; and Oct. 13 on Plummers Island, Md.

This subspecies occurs in low vegetation of moist woods in the Carolinian Fauna. Adults occur throughout the summer.

3. *Priocnemis* (*Priocnemis*) *aequalis* (Banks)

Ageniella aequalis Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 243, ♂. Type: ♂, Revelstoke, Selkirk Mts., British Columbia (Ithaca).

MALE: Forewing 3.7 to 5 mm. long; frons subpolished, with shallow punctures separated by about 0.3 their diameter; sixth sternite with its lateral hook unusually distant from its apical margin, posteromesal to the hook a weak semicircular impression that is bounded mesally by a weak oblique ridge; exposed part of subgenital plate tongue-shaped, about 1.3 as long as wide and covered with short oblique setae.

Black. Apical half of mandible rufous; apex, front, and under side of front tibia fulvous; wings subhyaline, the apical third of the forewing faintly infuscate.

FEMALE: Forewing 5 to 7.5 mm. long; frons weakly mat, with shallow punctures separated by about 0.3 their diameter.

Black. Apical half of mandible ferruginous; wings faintly infuscate, the forewing with a weak indefinite infuscation along the basal vein and nervulus, and its apical third moderately infuscate; apical portion of hind wing faintly infuscate.

SPECIMENS: ♂, Calgary, Alberta, July 18, 1917, Sladen (Ottawa). ♂, Fort Nelson, British Columbia, June 13, 1948, W. R. M. Mason

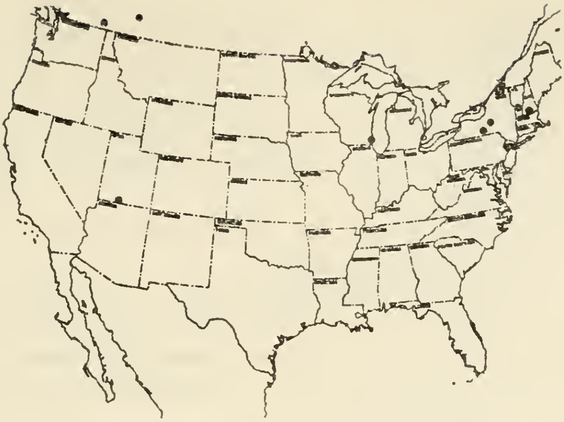


FIGURE 46.—Localities for *Priocnemis aequalis.*

(Evans). ♂ (type), Revelstoke, Selkirk Mts., British Columbia, July 1, 1905, J. C. Bradley (Ithaca). ♀, Pelham, N. H., Sept. 5, 1905, J. C. Bridwell (Washington). ♂, Ringwood, Tompkins County, N. Y., July 21, 1928, H. A. Scullen (Corvallis). ♂, Rome, N. Y., June 24, 1934, H. Townes (Townes). ♀, Norman Wells, Northwest Territory, July 23, 1949, W. R. M. Mason (Evans). ♂, Hemmingford, Quebec, July 19, 1925, G. H. Hammond (Ottawa). ♀, on flowers of *Pastinaca sativa,* Orderville, 5,500 ft., Utah, Aug. 14, 1948, H. E. Evans (Evans). ♀, Rutland, Vt., Aug. 1 to 5, 1916 (Cambridge). ♂, Muskego, Wis., Aug. 7 to 16, 1936, P. B. Lawson (Lawrence). 5♂, 2♀, Watson Lake, Yukon Territory, June 20, 1948, W. R. M. Mason (Evans and Townes). ♂, A. P. Morse (Cambridge).

This species is transcontinental in the Canadian and in the cooler parts of the Transition Zone.

4. *Priocnemis (Priocnemis) hestia* (Banks)

PLATE 2, FIGURE 24

Ageniella hestia Banks, 1915, Canadian Ent., vol. 47, p. 400, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Ageniella crassicornis Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 108, ♂. Lectotype: ♂, Forest Hills, Mass., June 11, 1910, C. T. Brues (Cambridge).

MALE: Forewing 3.7 to 5 mm. long; frons subpolished, with small subadjacent punctures; sixth sternite with a pair of short, median, longitudinal, parallel, high carinae; exposed part of subgenital plate tongue-shaped, its apex subtruncate, about 1.3 as long as wide and covered with long erect hairs.

Black. Apical half of mandible rufous or the mandible mostly pale. Head, body, and legs with a variable amount of pale markings, at least the front of the front tibia fulvous and usually with more or less extensive additional pale markings as follows: palpi pale brown; clypeus with its apical margin cream-colored to mostly cream-colored; hind margin of pronotum pale brown; legs fulvous, the tibia, tarsus, and knees of the hind legs fuscous; basal half of abdomen more or less extensively tinged with fulvous. Wings subhyaline, the forewing with a faint infuscation along its basal vein, subapically, and along its apical margin.

Female: Forewing 4 to 6 mm. long; frons mat, with very dense, fine, weak, inconspicuous punctures.

Black. Apical half of mandible rufous; front tibia fulvous apically; wings hyaline, the forewing with a broad conspicuous infuscation along the basal vein and nervulus, and extending across the anal cell, also infuscate in its apical third with a conspicuous hyaline area in the basal 0.7 of the fourth cubital cell.

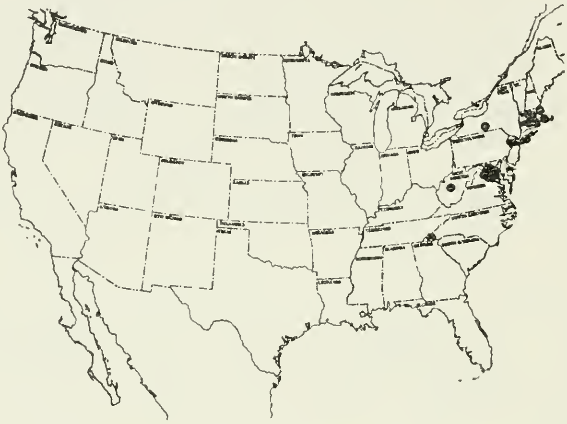


Figure 47.—Localities for *Priocnemis hestia.*

Specimens (23 ♂, 26 ♀): From Connecticut (Soapstone Mount near Somers and Stafford); District of Columbia; Maryland (Cabin John, Glen Echo, and Takoma Park); Massachusetts (Forest Hills, South Natick, and Woods Hole); New York (Farmingdale and Ithaca); North Carolina (Nantahala Gorge at 3,000 ft.); Virginia (Chain Bridge, Dead Run, Dunn Loring, and Falls Church); and West Virginia (Kanawha Station).

Dates of collection are distributed from May 26 to Sept. 11. Nearly half of the collections were made in August. Five different collections are labeled "in woods."

This species occurs in woods in the Alleghenian fauna from Massachusetts to North Carolina. The adult stage occurs in summer.

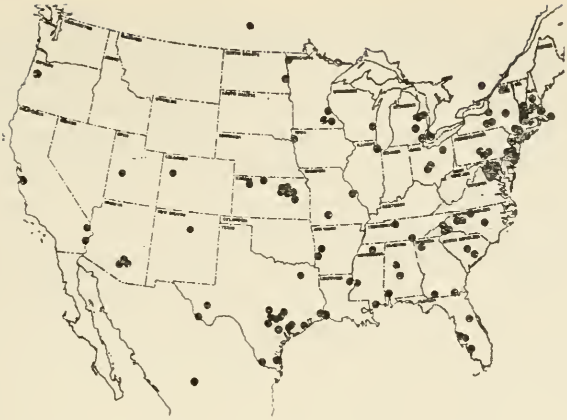


Figure 48.—Localities for *Priocnemis cornica.*

5. *Priocnemis (Priocnemis) cornica* (Say)

Pompilus (Miscus) cornicus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 305, ♀ (♂ misdetermined ?). Type: ♀, Indiana (destroyed).

Pompilus (Miscus) conicus Leconte, 1859, *in* The complete writings of T. Say on the entomology of the United States, vol. 2, p. 746 (emendation).

Pompilus (Priocnemis) pomilius Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 116, ♀. Lectotype: ♀, Pennsylvania (Philadelphia).

Salius pompilius (!) Dalla Torre, 1897, Catalogus hymenopterorum . . ., vol. 8, p. 237 (misspelling).

Priocnemis pompilus (!) Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 245 (misspelling).

Ageniella eximia Banks, 1919, Canadian Ent., vol. 51, p. 83, ♂. Lectotype: ♂, Falls Church, Va., May 30, N. Banks (Cambridge).

Ageniella aludra Brimley, 1928. Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 201, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

Male: Forewing 3 to 4 mm. long; frons weakly mat, with close, very fine, indistinct punctures; sixth sternite between its lateral hooks smooth, with hairs to the apex; exposed part of subgenital plate spatulate, about 2.3 as long as wide and covered with long, rather sparse, strongly recurved hairs.

Black. Apical half of mandible rufous; apical half of middle and hind femora often with a more or less extensive fulvous stain or mark; wings weakly infuscate.

Female: Forewing 4 to 7 mm. long; frons mat, with very dense, fine, weak, inconspicuous punctures.

Black. Apical half of mandible rufous; wings infuscate, the forewing a little darker than the hind wing.

Specimens (156♂, 305♀): From Alabama (Selma, Jackson, and Tuscaloosa); Arizona (Globe, near Roosevelt Lake, and Tempe); Arkansas (Bates, Galloway, Mount Magazine in the Ouachita Mts., and White River); California (Blythe, Needles, and San Antonio in Santa Clara County); Colorado (Rifle); Connecticut (East Hartford); District of Columbia; Florida (Bradentown, Myakka River State Park, Orlando, and Punta Rassa); Georgia (Billys Island in the Okefenokee Swamp, Cassville, and Spring Creek in Decatur County); Illinois (Chicago); Iowa (Sioux City); Kansas (Baldwin, Lawrence, Manhattan, Onaga, Randolph, St. George, Sheridan County, and Smith County); Louisiana (Sabine River in Calcasieu County, and Tallulah); Maryland (Burnt Mills, Glen Echo, and Laurel); Massachusetts (Boston, Cummington, Mount Greylock, and Provincetown); Michigan (near Monroe, Oakland County, Port Austin, and Sand Point in Huron County); Minnesota (Lancaster, Olmsted County, fish hatchery at St. Peter, and Washington County); Mississippi (Caryville, Holly Springs, Natchez, and Pass Christian); Missouri (Jerseydale, St. Louis, and Springfield); New Brunswick (Nerepis); New Hampshire (Gerrish and Pelham); New Jersey (Camden County, Gloucester County, Maurice River at Vineland, Moorestown, and Riverton); New Mexico (Las Vegas); New York (Fort Montgomery, Gloversville, Ithaca, Long Beach on Long Island, McLean, Oswego, and White Plains); North Carolina (Balsam Gap, Cedar Mountain, Crabtree Meadows in Yancey County at 3,600 ft., Hamrick, Mount Pisgah, Raleigh, Roan Mt., and Walnut); North Dakota (Fargo); Ohio (Columbus, Franklin County, and Shaker Heights); Oregon (Peoria); Ontario (Chatham and Ottawa); Pennsylvania (Bowmansdale, Harrisburg, Highspire, and Newtown); South Carolina (Columbia and Florence); Texas (Bastrop County, Brazos County, Davis Mts., Fedor, Galveston, Hidalgo, Liberty Hill, New Braunfels, Orange, Port Isabel, Presidio, Richmond, Victoria, Wharton, Williamson County, and Wolfe City); Utah (Kanosh Flats); Vermont (Rutland); Virginia (Arlington, Dunn Loring, Falls Church, Fort Humphrey, and Vienna); Wisconsin (Muskego); and México (Huachinango in Puebla and Nombre de Dios in Durango).

Collection dates are mostly from June to Oct. 15. In the vicinity of the District of Columbia the earliest and latest dates are May 19 and Oct. 16. Unusually early and late dates elsewhere are: Mar. 28 at Myakka River State Park, Fla.; Apr. 1 to 7 at Needles, Calif.; Apr. 2 at Presidio, Tex.; Apr. 17 near Roosevelt Lake, Ariz.; Apr. 25 at Kanosh Flats, Utah; Apr. 30 in Brazos County, Tex.; May 22 at Tuscaloosa, Ala.; May 31 in Gloucester County, N. J.; June 5 at Ithaca, N. Y.; Oct. 10 at Ottawa, Ontario; Oct. 21 at Sioux City, Iowa; and Nov. 10 at Manhattan, Kans. Six specimens were taken with prey by H. E. Evans, as follows: ♀, with *Zygoballus nervosus* ♀,

E. Hartford, Conn., June 28, 1946; ♀, with *Pirata arenicola* ♀, E. Hartford, Conn., Aug. 1, 1946; ♀, with immature *Evarcha hoyi*, E. Hartford, Conn., Sept 2, 1947; ♀, dragging a very young *Lycosa* on clay bank, Riley County, Kans., Oct. 2, 1949; ♀, on clay bank with immature *Pardosa* ♂, Riley County, Kans., Oct. 16, 1949; ♀, stinging an immature *Lycosa* several times, including once on the back, Manhattan, Kans., Oct. 10, 1949. Flower records on the specimens before me comprise *Ranunculus californicus*, *Daucus carota*, and *Bifora americana*. Seven of the collections were made "on sand" and one "in woods." My own observations indicate that the usual habitat is rather bare ground in the open, often somewhat sandy.

This species occurs in the entire United States and southern Canada. The usual habitat is bare or rather sparsely covered ground in the open. Adults occur from early summer to midfall.

6. *Priocnemis (Priocnemis) minuscula* (Banks), new combination

PLATE 2, FIGURE 25

Agenia minuscula Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 110, ♂.
Type: ♂, Dallas, Tex. (Cambridge).

MALE: Forewing 3.1 to 4 mm. long; frons weakly mat, with small, shallow, adjacent punctures; exposed part of subgenital plate spatulate, as seen from below convex transversely and concave longitudinally, with a single median row of long erect hairs, otherwise bare.

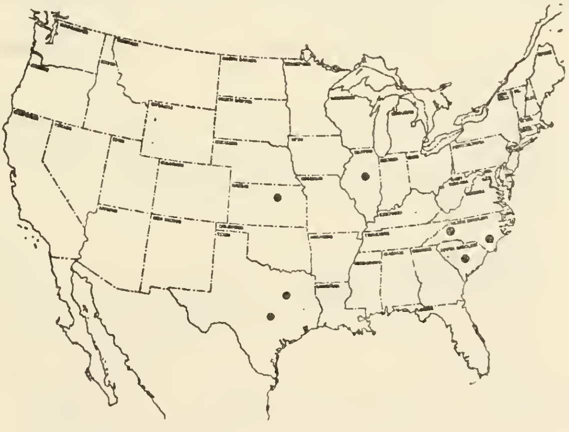


FIGURE 49.—Localities for *Priocnemis minuscula*.

Black. Apical part of mandible, sometimes the underside of scape, most of legs, much of first abdominal segment, all or most of the second abdominal segment, and the basal part of the third segment fulvo-ferruginous. The legs have the coxae basally to entirely, and the trochanters sometimes infuscate. The fore tarsus apically, the middle and hind tibiae at the base and apex or entirely, and all of the middle and hind tarsi are more or less infuscate. The first abdominal segment is infuscate basally and the second tergite is sometimes infuscate medially. Wings subhyaline.

Female: Forewing 3.8 to 4.2 mm. long; frons mat, with very fine, close, and indistinct punctures; wings unusually short and narrow, but functional.

Black. Mouthparts, apical half of clypeus, scape, pedicel, prothorax, tegula, legs, and abdomen rufous; wings slightly infuscate, the forewing with a strong but indefinite fuscous transverse band on the basal vein and strongly infuscate from the level of the base of the stigma to the apex, often somewhat less strongly infuscate beyond the apex of the radial cell; apical part of hind wing somewhat infuscate.

The correctness of the association of the female with the male is uncertain.

Specimens: ♀, Bloomington, Ill., July 8, 1909 (Ottawa). ♀, Manhattan, Kans., Oct. 24, 1930, D. A. Wilbur (Manhattan). ♀, Hamrick, N. C., Aug. 29, 1950, H. Townes (Townes). ♂, Wallace, N. C., June 17, 1949, H. Townes (Townes). ♂, Columbia, S. C., Aug. 11, 1951, G. F. Townes (Townes). ♀, Dallas, Tex., June 3, 1911, H. Pinkus (Washington). ♂ (type), Dallas, Tex., Aug. 2, 1916, F. C. Bishopp (Cambridge). ♀, Liberty Hill, Tex., June 18, 1936, (Strandtmann).

The female collected at Hamrick, N. C., was found crawling along the ground in the edge of a weedy field, unwilling to take flight, and appearing much like an ant.

This species occurs in the Carolinian and Austroriparian faunas.

7. *Priocnemis (Priocnemis) abbreviatus*, new species

Male: Unknown.

Female: Body 4 mm. long; frons mat, with very fine punctures separated by about their diameter; wings vestigial, the forewing about 1.6 mm. long, about 0.78 as long as the thorax.

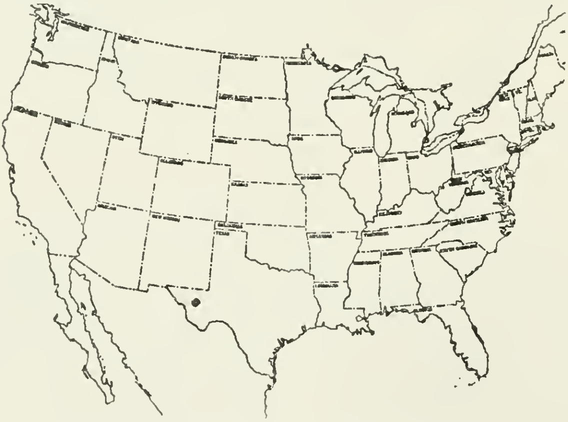


Figure 50.—Locality for *Priocnemis abbreviatus*.

Black. Mandible, apical margin of clypeus, most of scape and pedicel, thorax except for some fuscous sutures, part of each coxa, apex and more or less extensive suffusion of femora, tibiae, tarsi, and abdomen except for broad apical margins of each segment dull ferruginous.

Type: ♀, on dried mud, 10 miles west of Fort Davis, Tex., 5,000 ft., July 15 to 23, 1948, H. E. Evans (Washington, USNM 61795).

8. *Priocnemis (Priocnemis) nigriceps* (Ashmead)

Myrmecosalius nigriceps Ashmead, 1903, Proc. Ent. Soc. Washington, vol. 5, p. 308, ♀. Type: ♀, Texas (Washington).

Male: Forewing 3.2 to 4 mm. long; frons mat, with close, minute, shallow punctures; exposed part of subgenital plate irregularly spatulate, its basal half with a large, flat, coarsely punctate, triangular area with long erect hairs, its apical half polished, decurved, with a median row of long erect hairs but otherwise bare.

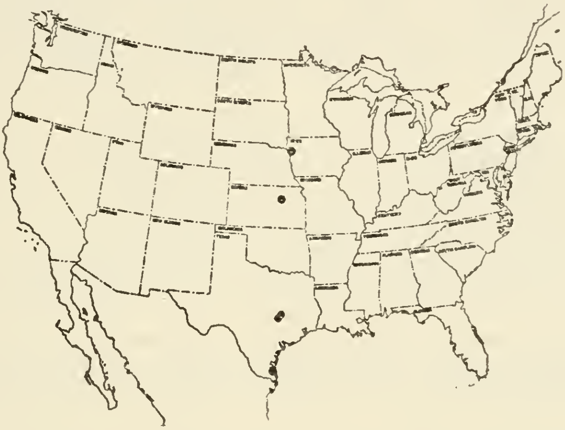


Figure 51.—Localities for *Priocnemis nigriceps*.

Black. Apical half of mandible, first abdominal segment except basally, second abdominal segment entirely, and often the third abdominal segment basally rufous; wings faintly infuscate.

It is not certain that this male is correctly associated with the female.

Female: Body 4.5 to 7 mm. long; frons mat, with very fine punctures separated by about 0.5 their diameter; wings vestigial, the forewing about 0.3 as long as the thorax.

Rufous. Head except for the clypeus and mouth parts black; antenna rufous basally, the rest blackish; trochanters more or less infuscate.

Specimens: ♂, Sioux City, Iowa, May 3, 1937, C. N. Ainslie (Washington); ♀, Sioux City, Iowa, Aug. 8, 1928, C. N. Ainslie (Washington). ♂, Manhattan, Kans., June 14, 1935, D. A. Wilbur (Manhattan). ♀, Riley County, Kans., Oct. 6, J. B. Norton (Manhattan). ♂, Brownsville, Tex., Nov. 2, 1943, I. Shiller (Washington). ♂, College Station, Tex., Nov. 9, 1936 (College Station, Tex.). 6♀, Fedor, Lee County, Tex., May 1910, May 14, 1902, Oct. 1908, Oct. and Nov. 1909, G. Birkmann (Cambridge). ♀, Fedor, Lee County, Tex., Oct. 1909, G. Birkmann (Ithaca). ♀, Lee County, Tex., May 1908, G. Birkmann (Cambridge). ♀ (type) Tex. (Washington). ♀, no data (Cambridge). ♂, no data (Manhattan).

9. *Priocnemis (Priocnemis) notha* (Cresson)

MALE: Forewing 4 to 6 mm. long; frons subpolished, with small punctures that are separated by about 0.8 their diameter; sixth sternite between its lateral hooks smooth; exposed portion of subgenital plate oblanceolate to spatulate, about 2.5 as long as wide, subbasally with a median erect compressed teeth or with a pair of teeth, parallel ridges, or elongate tubercles; subgenital plate with a few erect hairs basad of or between the teeth or tubercles but none beyond. There is some tendency for the various forms of the subgenital plate characteristic of different subspecies to intergrade in specimens from intermediate areas.

FEMALE: Forewing 4.3 to 7.5 mm. long; frons subpolished, its punctures separated by about 0.5 their diameter.

Both sexes are black with the wings uniformly infuscate and the abdomen black, or partly to almost entirely red.

There are four subspecies, differing in the amount of black on the abdomen and in the shape of the tooth on the male subgenital plate.

9a. *Priocnemis (Priocnemis) notha navajo* Banks, new status

Priocnemis navajo Banks, 1933, Psyche, vol. 40, p. 15, ♀. Type: ♀, Apache Camp, Santa Catalina Mts. at 5,500 ft., July 25, 1917, Ariz. (Cambridge).

MALE: Forewing 4 to 6 mm. long; exposed portion of subgenital plate spatulate, about 2.5 as long as wide, medially with its edges

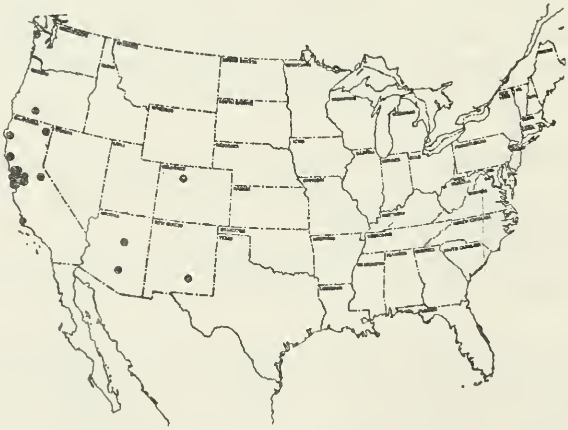


FIGURE 52.—Localities for *Priocnemis notha navajo.*

raised as a pair of strong longitudinal parallel ridges or elongate tubercles, between these ridges and basally with long erect hairs.

Black. Apical half of mandible rufous; wings infuscate.

The male of this subspecies is indistinguishable from that of *P. notha occidentis.*

FEMALE: Forewing 4.5 to 7.5 mm. long; frons subpolished, with rather coarse punctures separated by about 0.5 their diameter.

Black. Apical half of mandible rufous; wings strongly infuscate.

SPECIMENS (42♀): From Arizona (Mormon Lake and the Santa Catalina Mts. at 5,500 ft., 6,000 ft., 7,500 to 8,500 ft., 8,000 ft., and 9,000 ft.); California (Berkeley, Buck Creek in Modoc County, Carmel, Felton, Lands End in San Francisco County, Mount Love in San Francisco County, Mokel Hill in Calaveras County, Mount Tamalpais, Orick, hills back of Oakland, "Redwood" in Marin County, San Bruno, San Rafael, San Mateo, Tracy, and Yorkville); Colorado (Rabbit Ears Pass at 9,500 ft.); New Mexico (Cloudcroft at 9,000 ft.); Oregon (Klamath Lake); Washington (Forks); and México (meadow valley in the Sierra Madre).

Most dates of collection are in June through August, or in the warmer parts of the range, from May 15 through August. Dates outside of the latter range are: May 1 at Yorkville, Calif.; May 7 at Berkeley, Calif.; Sept. 21 at Tracy, Calif.; Oct. 1 at Carmel, Calif.; and Oct. 27 at Berkeley, Calif. A number of males collected together with these females make an unquestionable association of the sexes, but they are indistinguishable from males of the subspecies *occidentis.* Some additional males from the same general area as the females represent additional specific localities, but are not reported because they do not in themselves give proof of the distribution of the subspecies.

This subspecies occurs in the Canadian and Transition Zones from the Pacific to the Rocky Mountains.

9b. *Priocnemis (Priocnemis) notha occidentis* Banks

Priocnemis occidentis Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 172 [♀]. Type: ♀, Oregon (San Francisco).

MALE: Indistinguishable from the male of the subspecies *navajo.*

FEMALE: Black. Apical half of mandible rufous; tarsi more or less stained with rufous; wings infuscate, averaging a little darker than in the subspecies *notha;* abdomen rufous, the base of the first segment blackish.

SPECIMENS (46♀): From California (Angora Peak, Gold Lake in Sierra County, Strawberry Valley in El Dorado County, and Upper Echo Lake at 7,400 ft.); Oregon (Blooming, Brownsville, Corvallis, and Warrenton); and Washington (Nahcotta and Puyallup).

Dates of collection are mostly in July, August, and September. Their extreme range is June 5 to Sept. 29. A number of males col-

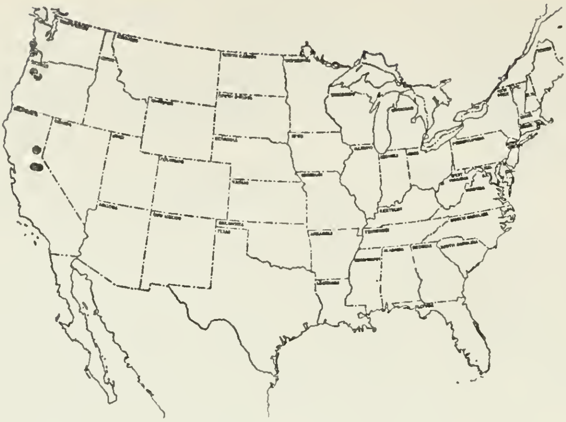


FIGURE 53.—Localities for *Priocnemis notha occidentis.*

lected together with these females make an unquestionable association of the sexes, but they are indistinguishable from males of the subspecies *navajo.* Some additional males from the same general area as the females represent additional specific localities, but are not reported because they do not in themselves give proof of the distribution of the subspecies.

This subspecies occurs in the Pacific States, mostly in the Transition Zone. Adults occur mostly in middle and late summer and in early fall.

9c. *Priocnemis (Priocnemis) notha alaskensis,* new subspecies

MALE: Forewing 3.5 to 4.5 mm. long; median elevation on subgenital plate not as high as in the subspecies *notha notha* and longitudinally divided so that there is a pair of teeth rather than a single one.

Black. Apical half of mandible dusky rufous; wings rather weakly infuscate; basal half of abdomen with obscure rufous stains.

FEMALE: Forewing 4.5 mm. long. Black. Apical 0.65 of mandible rufous; wings moderately infuscate; basal 0.4 of abdomen mostly rufous.

TYPE: ♂, 14 miles southwest of Circle, Alaska, June 25, 1948, R. I. Sailer (Washington, USNM 61699).

PARATYPES: ♀, same data as the type (Washington). 2 ♂, Norman Wells, Northwest Territory, July 20 and 22, 1949, W. R. M. Mason (Evans). 2 ♂, Watson Lake, Yukon Territory, June 20, 1948, W. R. M. Mason (Evans and Townes). ♀, Whitehorse, Yukon Territory, July 11, 1948, W. R. M. Mason (Evans).

An additional specimen, not examined but believed to be this subspecies is: ♀, with prey (*Paraphidippus marginatus*), Norman Wells, Northwest Territory, July 23, 1949, W. R. M. Mason (Ottawa).

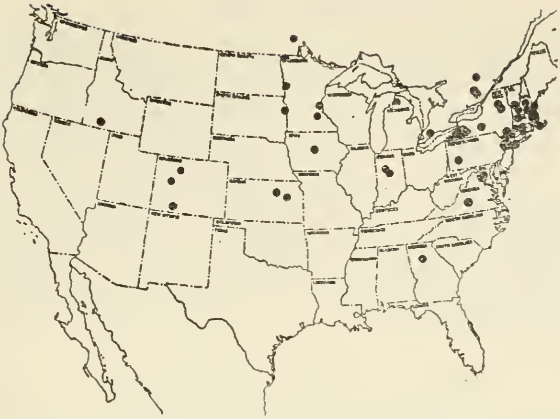


FIGURE 54.—Localities for *Priocnemis notha notha.*

9d. *Priocnemis (Priocnemis) notha notha* (Cresson)

Pompilus (Priocnemis) nothus Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 118, ♀. Type: ♀, Connecticut (Norton collection, probably destroyed).
Cryptocheilus paeneparcus Viereck, 1906, Trans. Amer. Ent. Soc., vol. 32, p. 202, ♀. Type: ♀, Douglas County at 900 ft., Kans. (Lawrence).

MALE: Black. Apical half of mandible rufous; front tibia, tarsus, and apex of femur more or less fulvous; wings moderately infuscate; basal half of abdomen rufous.

FEMALE: Black. Apical half of mandible rufous; wings infuscate; abdomen rufous, blackish on the apical 0.35 and on the base of the first segment.

SPECIMENS (14♂, 97♀): From Colorado (Granite Peaks Camp near Bayfield at 9,000 ft., New Castle, and Steamboat Springs); Connecticut (Chapinville, Colebrook, East Haddam, and East Hartford); District of Columbia; Georgia (Atlanta); Iowa; Kansas (Douglas County and Manhattan); Idaho (Hagerman); Indiana (Buck Creek and Frankfort); Iowa (Ames); Manitoba (Winnipeg); Massachusetts (Boston, Cummington, Forest Hills, Holliston, Needham, Wellesley, Wollaston, and Woods Hole); Michigan (Thumb Lake in Charlevoix County); Minnesota (Kittson County, Norman County, Ramsey County, and Zumbra Heights in Carver County); New Brunswick (Nerepis and St. Johns); New Hampshire (Hampton, Nelson, Pelham, and Wolfboro); New York (Bear Mt., Buffalo, Chafee, Chatham, Cliff Mt. in Essex County, East Aurora, Farmingdale, Grand Island, Ithaca, Lake Placid, Lockport, Oswego, top of Mount MacIntyre, Warrendale, and West Nyack); Ontario (Ottawa, Rockcliffe, and Toronto); Pennsylvania (Northeast and Pittsburgh); Prince Edward Island (Dalvay House in the Canadian National Park); Quebec (Aylmer, 75 miles north of Hull, and Grosse Madeleine on the Gaspé);

and Virginia (Great Falls and Hardscrabble Knob in Augusta County).

Most dates of capture are in July, August, and September, though there are a number earlier and later as follows: May 27 at Buck Creek, Ind.; June 2 and June 13 at East Hartford, Conn.; June 6 at Manhattan, Kans.; June 14 and 15 in Iowa; Oct. 3 at Hampton, N. H.; Oct. 9 at Ottawa, Ontario; Oct. 10 at Great Falls, Va.; Oct. 11 at Forest Hills, Mass.; and Oct. 23 at Washington, D. C.

This subspecies occurs in the Transition and Upper Austral Zones from the Atlantic Ocean to the Rocky Mountains. Farther westward it is replaced by other subspecies. Adults are common in the summer and the first half of fall.

Genus *Calicurgus* Lepeletier

Calicurgus Lepeletier, 1845, Histoire naturelle des insectes, hyménoptères, vol. 3, p. 397. Type: (*Pompilus fasciatellus* Spinola) = *hyalinatus* Fabricius; designated by Kohl, 1884.

Caliadurgus Pate, 1946, Trans. Amer. Ent. Soc., vol. 72, p. 78. Type: *Sphex hyalinata* Fabricius; original designation. (For my reasons why the name *Caliadurgus* is not adopted see U. S. Dep. Agr., Agr. Monogr. No. 2, p. 915, 1951.)

Agreeing with the description of the genus *Priocnemis* except: Forewing of Nearctic species 4.5 to 8.5 mm. long; pronotum very short; fore tibia of female with a single, very stout, blunt, spinelike bristle at its outer apical corner (this stout bristle is not present in other Pepsini); cubitus reaching wing margin; nervulus at the basal vein, or beyond it by less than 0.3 of its length; anal lobe subtriangular, much of its posterior margin straight (pl. 1, fig. 8); dorsal edge of hind tibia of female with a chevron-shaped row of teeth, of male smooth; last segment of tarsus without preapical bristles beneath.

There is but one polytypic Nearctic species, which is considered conspecific with the common Palaearctic *C. hyalinatus*. However, the genus is well represented in the Neotropics. I have seen the types of the Neotropic *Priocnemis christophei* Banks, *Priocnemis* (*Calicurgus*) *doddsi* Banks 1925, *Calicurgus andicolus* Banks 1946, *Calicurgus jocaste* Banks 1946, *Calicurgus loranthe* Banks 1946, *Calicurgus marginatus* Banks 1946, *Calicurgus orijones* Banks 1946, *Calicurgus quitus* Banks 1946, *Calicurgus rufigaster* Banks 1946, *Pompilus* (*Priocnemis*) *impiger* Cresson 1869, and *Pompilus pulchellus* Cresson 1865, and the oriental *Priocnemis* (*Calicurgus*) *ariel* Banks 1934. All these and doubtless most of the other Neotropic species now standing in *Calicurgus* are correctly placed in this genus. With such a rich representation in the Neotropics, one could expect the eventual discovery of additional Nearctic species along our southern border.

1. *Calicurgus hyalinatus* Fabricius

MALE: Forewing 4.5 to 6.5 mm. long. Black. Tibial spurs and a large spot on last tergite white; clypeus, hind margin of pronotum, and apex of fore coxa marked with white in some subspecies; femora and tibiae with various amounts of rufous; wings hyaline, the apical margin of the forewing faintly infuscate.

FEMALE: Forewing 5.5 to 8.5 mm. long. Black. Femora, tibiae, and abdomen with various amounts of rufous according to the subspecies; wings hyaline, the forewing with a large subapical fuscous spot and in some subspecies a narrow infuscation along the basal vein and the apical margin weakly infuscate. In the subspecies *excoctus* the subapical and the basal infuscate areas are confluent.

This species is Holarctic, with four subspecies in the Nearctic Region. The typical subspecies (*C. hyalinatus hyalinatus* Fabricius 1793) has a wide range in the Palaearctic Region. It is rather similar to the Nearctic *C. hyalinatus borealis*, differing in the male in the reduction or loss of the white markings on the clypeus, pronotum, and fore coxa, and in the slightly different distribution of the rufous color on the femora and tibiae; and differing in the female in having the black on the legs averaging a little more extensive and in the forewing a tendency toward more infuscation along the basal vein.

In the eastern half of the United States this is a conspicuous and common species during middle and late summer among low dense vegetation of moist woods.

Keys to the Nearctic subspecies of Calicurgus hyalinatus

MALES

1. Femora and tibiae of middle and hind legs entirely black.
   1d. **hyalinatus excoctus,** new subspecies
   Femora and tibiae of middle and hind legs more or less ferruginous. (Males of the following three subspecies cannot be separated with certainty.)
   1a. **hyalinatus borealis** (Banks)
   1b. **hyalinatus alienatus** (Smith)
   1c. **hyalinatus rupex** (Cresson)

FEMALES

1. Abdomen entirely black; forewing with an infuscate spot that occupies more than 0.5 its area; habitat: Arizona and New Mexico.
   1d. **hyalinatus excoctus,** new subspecies
   Abdomen with at least the basal two segments ferruginous; forewing with an infuscate spot that occupies about 0.25 its area (pl. 1, fig. 8) 2
2. Hind femur more than half infuscate or entirely black; habitat: Canadian Zone.
   1a. **hyalinatus borealis** (Banks)
   Hind femur less than half infuscate to entirely rufous 3

3. Abdomen black or infuscate apically; hind tibia with some infuscation at its apical 0.25; habitat: Alleghenian and Carolinian faunas.
1b. **hyalinatus alienatus** (Smith)

Abdomen entirely rufous; hind tibia entirely rufous except for a little darkening on its apical 0.1; habitat: Maryland and Kansas to México.
1c. **hyalinatus rupex** (Cresson)

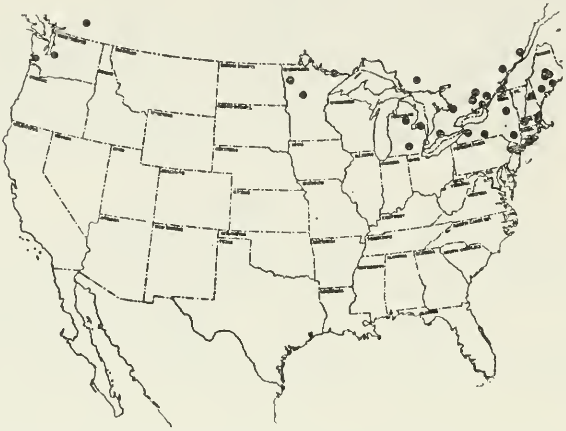


FIGURE 55.—Localities for *Calicurgus hyalinatus borealis.*

1a. *Calicurgus hyalinatus borealis* (Banks)

Priocnemis alienatus borealis Banks, 1933, Pysche, vol. 40, p. 10 [♀]. Lectotype: ♀, Stony Brook Reservoir, Mass., June 21, 1925 (Cambridge).

MALE: Black. Palpi brown; mandible variably colored with white, brown, and black; clypeus with the apical edge and a connecting pair of large lateral spots white; hind margin of pronotum, usually the front apex of the fore coxa, and an indistinct spot on apex of fore tibia behind, white; femora, tibiae, and front and middle tarsi fulvous to light brown, the femora basally infuscate and the middle and hind tibiae, especially the hind, more or less infuscate basally and apically; hind tarsus dark brown. The extent of basal infuscation on the femora varies from a narrow basal ring to more than 0.6 the length. The infuscation is usually most extensive on the front femur.

FEMALE: Black. Mandible with its apical 0.4± dull rufous; apices of femora and of tibiae with dull rufous stains; hind femur varying from half rufous and the rest rufo-fuscous or blackish to entirely black except usually for an apical rufous stain; hind tibia often extensively stained with rufous; abdomen with the basal two to three segments rufous, the base of the first segment black. Wings subhyaline, the forewing with the typical fuscous markings, including a distinct fuscous mark over the basal vein.

This is the northernmost Nearctic subspecies and the one closest to the Palaearctic subspecies *hyalinatus hyalinatus*. It and the neighboring subspecies in the Transition and Upper Austral Zones (*hyalinatus alienatus*) intergrade freely and collections from localities bordering between Canadian and Transition usually contain specimens assignable (on the division adopted here) to both subspecies.

SPECIMENS (61♀): From British Columbia (Revelstoke and Steelhead); Maine (Bangor, Brooksville, Lincoln County, Monroe, and Orono); Massachusetts (Cummington, Newton Center, Sagamore, and Stony Brook Reserve); Michigan (Ann Arbor, Roscommon County, and Sand Point in Huron County); Minnesota (Lake Itasca and Marshall County); New Brunswick (Tabusintac); New Hampshire (Tuckerman's Ravine on Mount Washington); New York (Chaffee, Buffalo, Fort Montgomery, Gardiners Island, Ithaca, Jamaica south on Long Island, Mount Whiteface at 2,000 to 4,000 ft., Port Jefferson on Long Island, Tottenville on Staten Island, and Woodhaven); Nova Scotia (Kings County and Middle River on Cape Breton Island); Ontario (Gananoque, Merivale, Orillia, Ottawa, Simcoe, and Sudbury); Quebec (Aylmer, Hemmingford, Joliette, and St. Anne); Prince Edward Island (Alberton); and Washington (Seattle and Westport). Collection dates are mostly from June 22 to the end of August. Those outside of this range are: June 9 at Woodhaven, Long Island, N. Y.; Sept. 3 at Tuckerman's Ravine on Mount Washington, N. H.; Sept. 19 at Seattle, Wash.; and Sept. 25 at Orono, Maine. A number of males collected within the range of this subspecies are not reported here because only their locality data would permit a definite assignment to a subspecies.

This subspecies is transcontinental in the Canadian Zone and the cooler parts of the Transition Zone. The flight period is mostly from June 22 to Aug. 31.

1b. *Calicurgus hyalinatus alienatus* (Smith)

PLATE 1, FIGURE 8

Pompilus fascipennis Say, 1824, *In* Keating, Narrative of an expedition to the source of St. Peter's River . . . , vol. 2 (appendix), p. 332, ♀ (preoccupied). Type: ♀ United States (destroyed).

Pompilus alienatus Smith, 1855, Catalogue of the hymenopterous insects in the . . . British Museum, vol. 3, p. 159 (new name).

Pompilus (*Agenia*) *calcaratus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 128, ♂. Type: ♂, Pennsylvania (Philadelphia).

Salius fasciipennis Dalla Torre, 1897, Catalogus hymenopterorum, vol. 8, p. 223 (emendation).

MALE: Colored as in the subspecies *borealis* except for an average smaller extent of infuscation on the femora and tibiae.

FEMALE: Black. Mandible with its apical 0.5± dull rufous; apices of front and middle tibiae and sometimes stains on the front and middle tibiae dull fulvous; hind femur and tibia rufous, the femur fuscous at the base and sometimes diffusely infuscate on up to half its area (if more extensively infuscate, the specimen is assigned to the subspecies *borealis*); hind tibia more or less infuscate basally and apically, always with at least a faint infuscation on the inner side near its apical 0.25; abdomen rufous, blackish at the base and black to rufo-fuscous beyond the third segment. Wings subhyaline, the forewing with the usual subapical and apical infuscation and with or without a weak infuscation along the basal vein.

This subspecies occupies typically the Alleghenian and Carolinian faunal areas. At the northern and southern edges of its range it intergrades freely with the subspecies *borealis* and *rupex* respectively, and occasional individuals with the typical coloration of these two occur well within the range of the present subspecies.

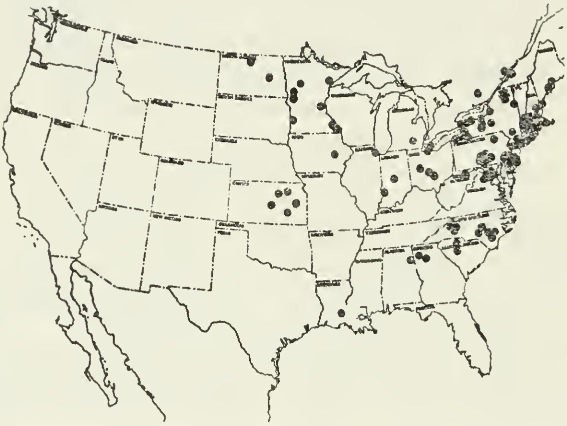


FIGURE 56.—Localities for *Calicurgus hyalinatus alienatus*.

SPECIMENS (238♀): From Alabama (Pyriton); Alberta (Scandia); Connecticut (Colebrook, East Haddam, East Hartford, Lyme, Milford, and Stafford); District of Columbia; Georgia (Atlanta and Rockmart); Illinois (Chicago); Indiana (Oaklandon and Vincennes); Iowa; Kansas (Baldwin, Coffey County, Douglas County, Manhattan, and Marion County); Maryland (Takoma Park); Maine (Belfast and Southport); Massachusetts (Blue Hills, Cheshire, Cummington, Holliston, Windsor, and Woods Hole); Michigan (Ann Arbor); Minnesota (Crookston, Floodwood, Houston, Itasca Park, Lake Itasca, Norman County, Olmsted County, Ortonville, and Princeton); New Hampshire (Hampton and Pelham); New Jersey (Adele, Burlington County, Camden County, Englewood, Hartford, Moorestown, Rancocas, and Riverton); New York (Alleghany State Park, Babylon, Bemus Point, Browns Mills, Cold Spring Harbor, Coram, East Aurora, Gowanda, Ithaca, Lake Placid, Lakeside Park, northwestern Long Island, Orient, Oswego, Rochester, Sea Cliff, Seneca County, Silver Bay, Spring Brook, Waterport, and Willowemoc); North Dakota (Bottineau and Devils Lake); North Carolina (Balsam Mt. at 3,315 ft., Black Mt., Clinton, Crabtree Meadows in Yancey County at 3,600 ft., Elizabethtown, Hamrick, Raleigh, Southern Pines, and Wallace); Ohio (Columbus, Logan County, Portage Lakes, Put in Bay, and Sugar Grove); Ontario (East Sister Island, Merrivale, Orillia, Ottawa, Point Pelee, and Ridgeway); Pennsylvania (Campbell, Camphill, Carlisle, Carlisle Junction, Eberlys Mill, Enola, Germantown, Inglenook, Linglestown, Mount Holly Springs, North East, Philadelphia, Rockville, Roxborough, Shiremanstown, Spring Brook, and York County); Quebec (Chambly, Montreal Island, and Quebec); South Carolina (Greenville and near Tigerville); Virginia (Arlington, Dunn Loring, Falls Church, Glencarlyn, Great Falls, and Rosslyn); and West Virginia (Terra Alta). Collection dates are mostly between May 20 and Sept. 20, those outside of this range being: Apr. 16 at Southern Pines, N. C.; May 1, 8, and 17 at Raleigh, N. C.; May 8 near Tigerville, S. C.; May 11 at Rockmart, Ga.; Sept. 23 at Germantown, Pa.; Sept. 24 at Riverton, N. J.; Sept. 30 at Hampton, N. H.; Oct. 3 at Enola, Pa.; and Oct. 6 at Greenville, S. C., and in Montgomery County, Md. Flower records comprise *Sambucus canadensis* and *Pastinaca sativa.* One female was taken with an immature of the subfamily Araneinae. A large number of males collected within the range of this subspecies are not reported because only their locality data would permit a definite assignment to a subspecies.

This subspecies occupies the Alleghenian, Carolinian, and part of the Austroriparian fauna. Adults occur from late spring to early fall.

1c. *Calicurgus hyalinatus rupex* (Cresson)

Pompilus (*Priocnemis*) *rupex* Cresson, 1869, Proc. Boston Soc. Nat. Hist., vol. 12, p. 372, ♀. Type: ♀, Orizaba, México (Philadelphia).

Pompilus (*Agenia*) *calcaratus* var. *accolens* Cresson, 1869, Proc. Boston Soc. Nat. Hist., vol. 12, p. 374, ♂. Lectotype: ♂, Orizaba, México (Philadelphia).

MALE: Colored as in the subspecies *borealis* except that the extent of infuscation on the femora and tibiae averages smaller.

FEMALE: Black. Colored as in the subspecies *alienatus* but with the abdomen beyond the third segment rufous, the hind femur and tibia ferruginous except for a narrow infuscate ring at the base of the femur and faint infuscations at the apical 0.1 of the femur and tibia. None of the specimens at hand have an infuscation over the basal vein.

This subspecies occurs in the Lower Austral Zone from the Atlantic to the 100th meridian and south to Orizaba, México. Occasional

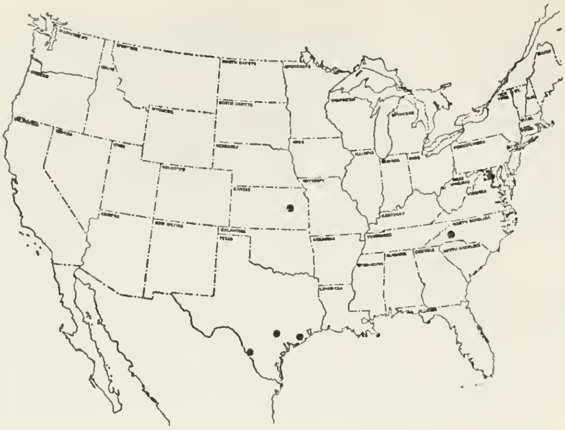


FIGURE 57.—Localities for *Calicurgus hyalinatus rupex.*

individuals with the coloration of *rupex* occur well within the range of the subspecies *alienatus*.

SPECIMENS: ♀, DeWitt, Ga., June 2, 1915, C. S. Spooner (Ithaca). ♀, Baldwin, Kans., Aug. 31, 1906, J. C. Bridwell (Washington). ♀, Cabin John, Md., Aug. 12, 1917, Fouts (Washington). ♀, Biltmore, N. C., June 26, 1912 (Washington). ♀, Devils River, Tex., May 5, 1907, F. C. Bishopp (Washington). 2♀, New Braunfels, Tex., June 27, 1917 (Cambridge). ♀, Pierce, Tex., Mar. 22, 1907, J. D. Mitchell (Washington). ♀, Texas, Belfrage (Washington). ♂ (type of *accolens*), ♀ (type of *rupex*), Orizaba, México (Philadelphia).

This subspecies occurs in México, in the Austroriparian fauna and as occasional specimens in the Carolinian fauna.

1d. *Calicurgus hyalinatus excoctus*, new subspecies

MALE: Black. Apical part of mandible ferruginous; palpi and middle tarsus dark brown; front tarsus and front of front tibia tan; hind margin of pronotum with a white band; tibial spurs and a spot on rear apex of front tibia white.

FEMALE: Black. Wings hyaline, the forewing with a large fuscous cloud extending from just basad of the basal vein to the apex of the third cubital cell (the area between the basal vein and the level of the stigma somewhat paler in the paratype); apical margin of forewing lightly infuscate. The paratype from near Cuernavaca has the forewing almost entirely black, but with a well-marked subapical subhyaline crescent, and the hind wing weakly infuscate.

TYPE: ♀, Manzano National Forest, N. Mex., Sept. 12, 1916, C. Heinrich (Washington, USNM 61700).

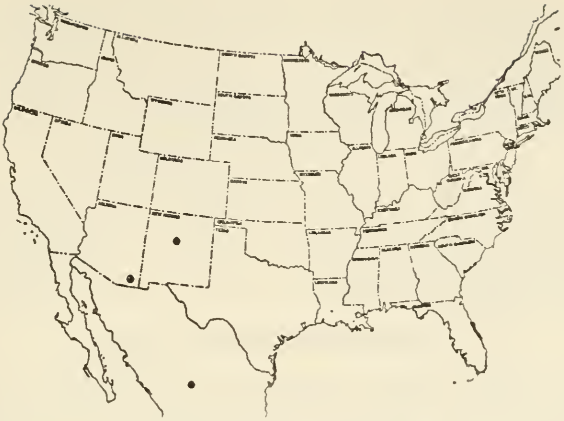


FIGURE 58.—Localities for *Calicurgus hyalinatus excoctus.*

PARATYPES: ♀, Chiricahua Mts., Ariz., July 8, 1932, J. D. Beamer (Lawrence). ♀, on forest floor, 15 miles north of Cuernavaca at 7,500 ft., Morelos, México, June 26, 1951, H. E. Evans (Evans). ♀, El Salto, Durango, México, Aug. 3, 1951, P. D. Hurd (Berkeley). ♂, San Juan Lagos, Jalisco, México, July 27, 1951, H. E. Evans (Evans).

Genus *Dipogon* Fox

Small sized, stout species, the forewing 2.3 to 10 mm. long; clypeus broad and short; mandible with 3 teeth, counting the apical point (in all other Nearctic Pepsinae, the mandible has only 2 teeth); cardo of maxilla of female with a fascicle of long hairs curving to and approximately reaching base of mandible (this fascicle is lacking or undeveloped in all other Psammocharidae); pronotum long, flat, its hind margin arcuate; second intercubital vein curved, oblique; second recurrent vein reaching second cubital cell at its basal 0.3 to 0.45; cubital vein reaching the wing margin in all species but those of the *pulchripennis* group; base of first discoidal cell without an irregularity in the wing membrane; nervulus beyond the basal vein by about 0.2 to 0.3 its length; nervellus ending some distance before the juncture of cubitella with discoidella; anal lobe about 0.35 as long as submediella (pl. 1, figs. 9, 10); hind tibia smooth dorsally, the brush on its inner side moderately broad, without a subapical constriction; last segment of tarsi without preapical bristles; tooth on tarsal claws small, erect, and acute.

The species of *Dipogon* probably all nest in holes in wood. The females of the subgenus *Deuteragenia* are taken most often on stumps and the trunks of dead trees, while those of the subgenus *Dipogon* are more frequent on smaller twigs and branches. The dark bands on the forewing of most species give the appearance of the node and gaster of the Formicidae, and when seen running on trunks or twigs individuals of these species look very much like specimens of *Camponotus.*

The two subgenera are easily distinguished.

Key to the subgenera of Dipogon

1. Second cubital cell about as long as the third (pl. 1, fig. 9); maxillary beard of female brown to blackish . . . . **Deuteragenia** (p. 116)
   Second cubital cell about 1.3 as long as the third (pl. 1, fig. 10); maxillary beard of female white to stramineous . . . . **Dipogon** (p. 131)

Subgenus *Deuteragenia* Sustera

Agenia Schiødte, 1837, Krøyer's Naturhistorisk Tidsskrift, vol. 1, p. 321 (preoccupied). Type: *Sphex variegata* Linnaeus; designated by Westwood, 1840.

Anoplius Lepeletier, 1845, Histoire naturelle des insectes, hyménoptères, vol. 3, p. 440 (preoccupied). Type: (*Anoplius variegatus* Linden) = *variegatus* Linnaeus; designated by Pate, 1946.

Pogonius Dahlbom, 1845, Hymenoptera Europaea, vol. 1, p. 453 (preoccupied). Type: *Sphex variegata* Linnaeus; designated by Pate, 1946.

Deuteragenia Sustera, 1913, Verh. zool.-bot. Ges. Wien, vol. 72, p. 191 (new name for *Agenia* Schiødte).

Forewing 4.5 to 10 mm. long; maxillary beard of female brown to blackish; second cubital cell about as long as the third cubital cell (pl. 1, fig. 9).

This subgenus is largely Holarctic in distribution, but is represented also in the Neotropics. It contains the larger species of the genus. There are two species groups, as indicated in the keys and the group descriptions.

Keys to the Nearctic species of the subgenus Deuteragenia

MALES

(The males of *nubifer, duplicatus, thoracicus, iracundus, sericeus,* and *nigrior* are unknown.)

1. Cubital vein not reaching the wing margin (pl. 2, figs. 26, 27); radial vein not more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein; hooks on sixth sternite short and pointed backward; subgenital plate bulbous basally, with a long apical point. PULCHRIPENNIS GROUP 2
   Cubital vein reaching the wing margin (pl. 1, fig. 9; pl. 2, fig. 28); radial vein distinctly more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein; hooks on sixth sternite long and incurved; subgenital plate with a median longitudinal keel which is highest subbasally. VARIEGATUS GROUP 5

2. Flagellar segments without a distinct subbasal angulation; first flagellar segment about 2.2 as long as wide; basal vein margined with fuscous; point of subgenital plate with a broad longitudinal groove beneath. 1. **pulchripennis** (Cresson)

   Flagellar segments each with a strong subbasal angulation on the inner and lower sides; first flagellar segment about 1.5 as long as wide; basal vein not margined with fuscous; point of subgenital plate without a groove, convex beneath. SUBSPECIES OF PAPAGO 3

3. Forewing rather strongly infuscate; range: Florida. 2c. **papago floridanus**, new subspecies

   Forewing hyaline, with or without a fuscous spot 4

4. Forewing with a large, distinct, fuscous spot; range: eastern United States and Canada . . . . 2b. **papago anomalus** Dreisbach

   Forewing subhyaline, with its apical third faintly infuscate; habitat: British Columbia to Arizona . . . . 2a. **papago papago** (Banks)

5. Subgenital plate pointed at the apex; hooks on sixth sternite slender. 3. **calipterus** (Say)

   Subgenital plate with a deep notch in its apex; hooks on sixth sternite stout. 7. **sayi** Banks

FEMALES

1. Cubital vein not reaching the wing margin (pl. 2, figs. 26, 27); radial vein not more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein; clypeus with a small median apical transverse impression. PULCHRIPENNIS GROUP 2

   Cubital vein reaching the wing margin (pl. 1, fig. 9; pl. 2, fig. 28); radial vein distinctly more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein. VARIEGATUS GROUP 5

2. Forewing hyaline, with a narrow but conspicuous fuscous band along the basal vein and nervulus, as well as a broad fuscous band beyond the middle of the stigma (pl. 2, fig. 26) . . . . 1. **pulchripennis** (Cresson)

   Forewing black, or hyaline with a broad fuscous area at the level of the stigma but without a fuscous band along the basal vein and nervulus. Subspecies of *papago* 3

3. Forewing hyaline, with a broad fuscous area beyond the stigma (pl. 2, fig. 27); range: eastern United States and Canada. 2b. **papago anomalus** Dreisbach

   Forewing uniformly blackish 4

4. Punctures on mesopleuron separated by about 0.2 their diameter; punctures on second abdominal tergite separated by about 1.2 their diameter; range: British Columbia to Arizona . . . . 2a. **papago papago** (Banks)

   Punctures on mesopleuron separated by about 0.7 their diameter; punctures on second abdominal tergite separated by about 3.0 their diameter; range: Florida . . . . 2c. **papago floridanus**, new subspecies

5. Body clothed with very dense, appressed, grey to yellowish pubescense which gives a hoary appearance; tip of forewing whitish . . . 6. **sericeus** Banks

   Body clothed with moderately dense, appressed, grey pubescence which is rather inconspicuous; tip of forewing subhyaline 6

6. Clypeus with a strong, broad, transverse preapical impression; legs, scape, and thorax blackish. SUBSPECIES OF SAYI 7

   Clypeus without, or with a small weak transverse preapical impression; legs, scape, and often the thorax more or less rufous 8

7. Wings less extensively infuscate, about 0.3 of the first brachial cell and about 0.6 of the second discoidal cell infuscate (pl. 1, fig. 9); range: east of the Rocky Mountains . . . . 7a. **sayi sayi** Banks

Wings more extensively infuscate, about 0.6 of the first brachial cell and about 0.85 of the second discoidal cell infuscate (pl. 2, fig. 28); range: Rocky Mountains to the Pacific . . . . 7b. **sayi nigrior,** new subspecies

8. Punctures on posteromedian part of propodeum separated by about 2.5 their diameter; punctures on mesopleuron separated by about 0.7 their diameter; thorax black or rufous. SUBSPECIES OF CALIPTERUS 9

Punctures on posteromedian part of propodeum separated by about 0.4 their diameter; punctures on mesopleuron separated by about 0.2 their diameter; thorax rufous 11

9. Thorax rufous; range: Florida. 3c. **calipterus duplicatus,** new subspecies

Thorax black 10

10. Front coxa black; range: eastern United States, except Florida. 3a. **calipterus calipterus** (Say)

Front coxa ferruginous; range: México and southern California. 3b. **calipterus nubifer** (Cresson)

11. First tergite blackish; coxae blackish to dusky rufous; clypeus without a median subapical swelling; punctures of mesopleuron weak and indistinct. 4. **thoracicus,** new species

First tergite rufous; coxae rufous; clypeus with a weak median subapical swelling; punctures of mesopleuron sharp and distinct (though small and close). 5. **iracundus,** new species

PULCHRIPENNIS GROUP

Cubital vein not quite reaching the wing margin; radial vein not more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein; clypeus of female with a median, transverse, subapical impression; hooks on sixth sternite of male short and pointed backward; subgenital plate of male bulbous basally, tapered to a long point apically.

The Nearctic *pulchripennis* and *papago* are the only known species of this group.

1. *Dipogon* (*Deuteragenia*) *pulchripennis* (Cresson)

PLATE 2, FIGURE 26

Pompilus (*Agenia*) *pulchripennis* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 123, ♂, ♀. Lectotype: ♀, West Virginia (Philadelphia).

MALE: Forewing 5.3 to 6.5 mm. long; flagellar segments subcylindric and unusually long, without the angular swellings usual to this genus; first segment of flagellum about 2.2 as long as wide; mesopleuron a little more finely and densely punctate than in *D. papago anomalus*; apical 0.6 of subgenital plate somewhat flattened below and with a median longitudinal groove.

Black. Wings subhyaline, the forewing with a narrow infuscation along the basal vein and nervulus, and with a large subapical fuscous area.

FEMALE: Forewing 7 to 10 mm. long; clypeus with a sharp median transverse impression that is so near the apical margin that the margin appears to have a median thickening; punctures on mesopleuron separated by about 0.3 their diameter; punctures on second abdominal tergite separated by about 2.0 their diameter.

Black. Wings subhyaline, with a conspicuous fuscous band along the basal vein and nervulus, and a large fuscous area beyond the middle of the stigma.

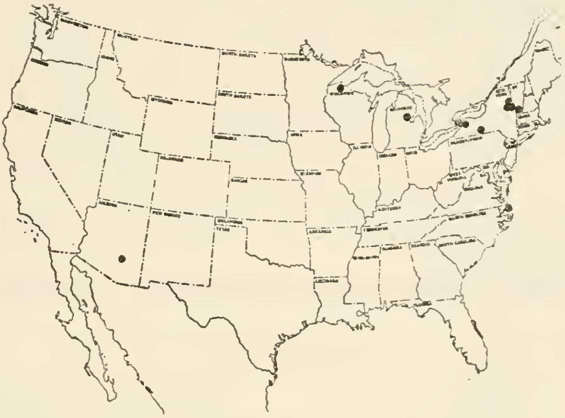


FIGURE 59.—Localities for *Dipogon pulchripennis*.

SPECIMENS: ♀, Mount Lemmon, Santa Catalina Mts., Ariz., Aug. 2 to 4, 1948, H. E. Evans (Evans). ♀, Bay County, Mich., Sept. 21, 1940, R. R. Dreisbach (Cambridge). ♀, in woods, Ithaca, N. Y., June 18, 1947, H. E. Evans (Evans). ♂, on tree trunk, Ithaca, N. Y., June 22, 1947, H. E. Evans (Townes). 2♂, Ithaca, N. Y., June 27, 1947, H. E. Evans (Evans). ♂, Ithaca, N. Y., July 5, 1947, H. E. Evans (Evans). ♂, Ithaca, N. Y., July 22, 1890 (Ithaca). ♀, Ithaca, N. Y., July 27, 1947, H. E. Evans (Townes). ♀, New Russia, Essex County, N. Y., Aug. 18, 1912, J. C. Bradley (Ithaca). ♀, Niagara Falls, N. Y., July 3, 1910, M. C. Van Duzee (Cambridge). ♀, top of Mount MacIntyre, N. Y., Aug. 27, 1940, H. Dietrich (Ithaca). ♀, Upper Ausable Lake, Essex County, N. Y., July 30, 1920 (Cambridge). ♀, Kill Devil Hill, N. C., May 28, 1948, K. V. Krombein (Krombein). ♂, Grimsby, Ontario, July 15, 1894 (Ottawa). ♀, Rutland, Vt., Aug. 1 to 15, 1916 (Cambridge). ♀ (type), West Virginia (Philadelphia). ♀, Sawyer County, Wis., Aug. 1 to 8, 1937, D. Murray (St. Paul).

This is a woodland species, occurring in the Canadian and Transition Zones of the eastern states and provinces and in the Canadian Zone of Arizona.

2. *Dipogon (Deuteragenia) papago* (Banks)

MALE: Forewing 5 to 7 mm. long; flagellar segments short, on the inner and under sides of each segment an angular subbasal swelling which gives the flagellum a notched or stepped appearance; first flagellar segment about 1.5 as long as wide; apical 0.6 of subgenital plate a compressed point, without a median groove.

Black. Wings variously marked, according to the subspecies.

FEMALE: Forewing 6 to 9 mm. long; clypeus with a subapical, median, transverse impression that is a little weaker and farther from the apex than in *D. pulchripennis*.

Black. Wings fuscous or subhyaline with a fuscous area, according to the subspecies.

This species is represented by three subspecies which together occur in southern Canada and in most of the United States.

2a. *Dipogon (Deuteragenia) papago papago* (Banks)

Deuteragenia papago Banks, 1933, Psyche, vol. 40, p. 17, ♀. Type: ♀, southern Arizona (Cambridge).

MALE: Wings hyaline, the apical third of the forewing faintly infuscate.

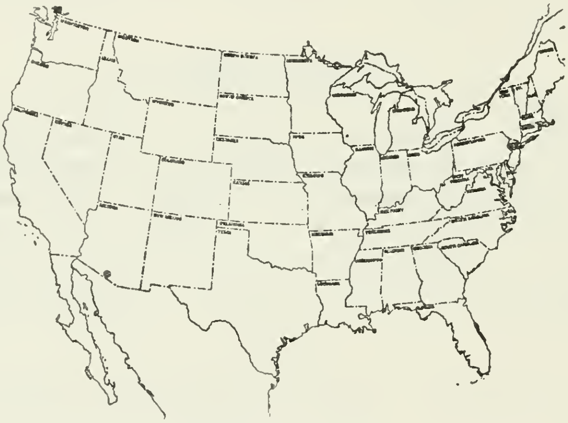


FIGURE 60.—Localities for *Dipogon papago papago*.

FEMALE: Punctures on mesopleuron separated by about 0.2 their diameter; punctures on second tergite separated by about 1.5 their diameter; wings blackish.

SPECIMENS: ♀ (type), southern Arizona, J. Bequaert (Cambridge). 2♂, Vancouver, British Columbia, July 4, 1939, W. G. Mathers (Ottawa). ♀, British Columbia, July 27, 1898 (Ottawa).

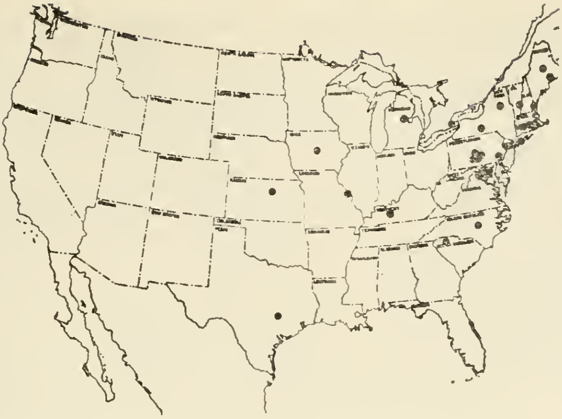


FIGURE 61.—Localities for *Dipogon papago anomalus*.

2b. *Dipogon (Deuteragenia) papago anomalus* Dreisbach

PLATE 2, FIGURE 27

Dipogon anomalus Dreisbach, 1953, Amer. Midl. Nat., vol. 49, p. 834, ♂. Type: ♂, Cohasset, Mass. (Cambridge).

MALE: Wings hyaline, the forewing with a subapical area and its apical margin infuscate.

FEMALE: Punctures on mesopleuron separated by about 0.4 their diameter; punctures on second abdominal tergite separated by about 1.5 their diameter; wings subhyaline, the forewing with a large infuscate area just beyond the middle of the stigma, the apex of both fore and hind wing weakly infuscate.

A female specimen from Columbia, S. C. (July 18, 1951, G. F. Townes, Townes Collection) is exactly intermediate between this subspecies and the subspecies *floridanus*.

SPECIMENS (10♂, 40♀): From Connecticut (East Hartford and Wallingford); District of Columbia; Iowa (Ames); Kansas (Manhattan); Kentucky (Mammoth Cave National Park); Maine (Mount Katahdin at 5,215 ft. and Orono); Maryland (Cabin John, Glen Echo, and Plummers Island); Massachusetts (Cohasset and Forest Hills); Michigan (Midland County); Missouri (St. Louis); New Hampshire (Hampton); New York (Bohemia, Ithaca, and top of Mount MacIntyre); North Carolina (Durham); Ohio; Ontario (Grimsby); Pennsylvania (Linglestown, North Cumberland, State College, West Chester, and West Fairview); Rhode Island (Buttonwoods); South Carolina (near Tigerville); Texas (Brazos County); Vermont (Woodstock); and Virginia (Alexandria, Arlington, and Great Falls).

Dates of collection are distributed from midspring to midfall, with apparent peaks of abundance in June and in September. Unusually early and late dates are: May 8 near Tigerville, S. C.; May 22 at Great Falls, Va.; May 28 on Plummers Island, Md.; Oct. 15 at State College, Pa., and at Arlington, Va.; and Oct. 24 in Brazos County, Tex. Other biological data with these specimens state that two different collections were made in woods; that a male emerged on Mar. 25 from material collected on Feb. 27 at North Cumberland, Pa., by Kirk and Champlain; that a male emerged on June 2 from *Carya* wood collected at Linglestown, Pa., by W. S. Fisher; that a male and a female emerged in June from *Carya* wood collected at Forest Hills, Mass.; that a male emerged from *Fagus grandifolia* wood collected at Durham, N. C., by Wm. Haliburton and J. A. Beal; and that a female from Manhattan, Kans., was taken by H. E. Evans while transporting prey (*Paraphidippus aurantius*) over a dried stream bed.

This subspecies occurs in the Canadian, Transition, and Upper Austral Zones from the Atlantic to the 100th meridian. It occurs in woodlands and nests in dead wood. Adults are on the wing from midspring to midfall.

2c. *Dipogon (Deuteragenia) papago floridanus*, new subspecies

Male: Forewing moderately infuscate, a little more hyaline basally and between the basal vein and the stigma; hind wing subhyaline with its apical part weakly infuscate.

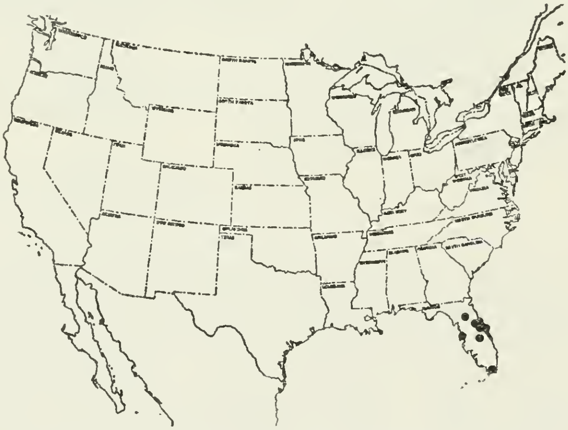


Figure 62.—Localities for *Dipogon papago floridanus*.

Female: Punctures on mesopleuron separated by about 0.7 their diameter; punctures on second tergite separated by about 3.0 their diameter; wings blackish.

Type: ♀, Osceola County, Fla., Aug. 17, 1929, J. J. Kirkland (Washington, USNM 61690).

Paratypes: ♀, Artesia, Fla., July 26, 1944, (College Station, Tex.). ♂, Gainesville, Fla., Apr. 23, 1924, G. B. Merrill (Krombein). ♀, Interlachen, Fla., Apr. 2, 1951, H. and M. Townes (Townes). ♀, Orange County, Fla., May 16, 1929, E. Storrs (Washington). ♀, Orange County, Fla., July 5, 1929, G. J. Guard (Washington). 2 ♂, Paradise Key, Fla., Apr. 22 and 23, 1954, K. V. Krombein (Krombein). ♂, Pinellas County, Fla., "12–11–29," B. P. Moora (Washington). ♀, Sanford, Fla., Feb. 1900, C. F. Baker (Washington). 2 ♀, Seminole County, Fla., July 7 and 17, 1929, H. Clark (Washington). 2 ♂, Tarpon Springs, Fla., Mar. 21, 1950, H. Townes (Townes).

This subspecies is known from Florida. A specimen intermediate to the subspecies *anomalus* is known from Columbia, S. C., indicating that *floridanus* may be more widespread in the Austroriparian fauna.

VARIEGATUS GROUP

Cubital vein reaching the wing margin; radial vein more strongly angled at its juncture with the second intercubital vein than at its juncture with the third intercubital vein; hooks on sixth sternite of male long and incurved; subgenital plate of male with a strong median longitudinal keel.

The Palaearctic *variegatus* Linnaeus 1758, the Nearctic *calipterus, thoracicus, iracundus, sericea,* and *sayi,* and a species from Paraguay belong to this group.

3. *Dipogon (Deuteragenia) calipterus* (Say)

Male: Forewing 5.0 mm. long; clypeus evenly rounded to the simple, truncate apex; flagellar segments each with an angular subbasal swelling which gives the flagellum a notched or stepped appearance; first segment of flagellum about 2.4 as long as wide; hooks on sixth sternite long, slender, curved inward and backward; subgenital plate with a pointed apex and a high sharp keel that is highest subbasally.

Female: Forewing 5.7 to 7.4 mm. long; clypeus evenly rounded to the simple, almost truncate apex; mesoscutum weakly mat, with fine sharp punctures; mesopleuron subpolished, with small punctures separated by about 0.5 their diameter; propodeum medially subpolished, with small punctures separated by about 2.5 their diameter; second tergite subpolished, with small punctures separated by about 2.0 their diameter.

Black. Mandible except basally, apical margin of clypeus, and antenna fulvous, the antenna somewhat infuscate apically; legs more or less rufous, according to the subspecies; thorax blackish or rufous; wings hyaline, the forewing with two sharply defined transverse fuscous bands, a narrow one along the basal vein and nervulus and a broad one beyond the middle of the stigma; apical margin of forewing and apical part of hind wing weakly infuscate.

This species is represented by three subspecies occurring in the eastern United States, in México, and in southern California.

3a. *Dipogon* (*Deuteragenia*) *calipterus calipterus* (Say)

Pompilus calipterus Say, 1836, Boston Journ. Nat. Hist. vol. 1, p. 302 (Leconte edition, vol. 2, p. 744, [♀]. Type: ♀, Indiana (destroyed).

Deuteragenia pilosa Banks, 1933, Psyche, vol. 40, p. 16, ♀. Type: ♀, Lafayette, Ind. (Cambridge).

Dipogon femur-aureus Dreisbach, 1953. Amer. Midl. Nat., vol. 49, p. 832, ♀ (new synonymy). Type: ♀, Alto Pass, Ill. (Urbana).

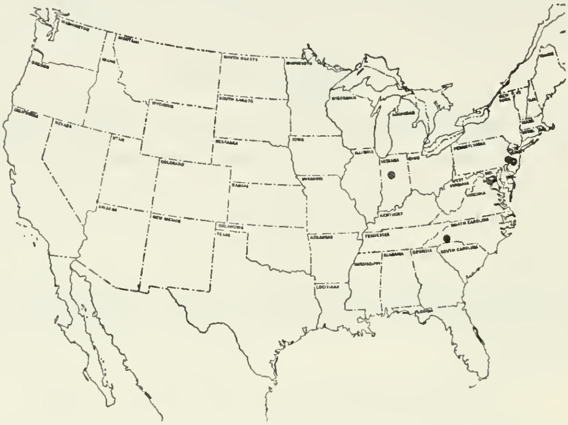


FIGURE 63.—Localities for *Dipogon calipterus calipterus.*

MALE: Under side of antenna, apical half of mandible, front tibia and tarsus, and middle tarsus except basally and apically, dusky fulvous; hind tarsus and front of front femur tinged with fulvous.

FEMALE: Thorax blackish; front leg beyond the trochanter ferruginous; middle and hind tarsi largely rufous; rest of legs blackish with rufous tinges. In one specimen the hind side of the front femur is dark brown rather than rufous.

The type of the name *femur-aureus*, from Alto Pass, Ill., is intermediate to the subspecies *duplicatus*, having the thorax blackish but the legs colored as in *duplicatus*.

SPECIMENS: ♂, ♀, reared from cocoons in pith, Washington, D. C., mid-May 1935, J. C. Bridwell (Washington). ♀ (type of *pilosa*), Lafayette, Ind. (Cambridge). ♀, Camden County, N. J., June 28, 1891 (Washington). ♀, Cedar Mt., N. C., Sept. 5, 1939, H. Townes (Townes). ♀, Philadelphia, Pa. (Washington). ♀, Dunn Loring (near Vienna), Va., July 29, 1951, K. V. Krombein (Krombein).

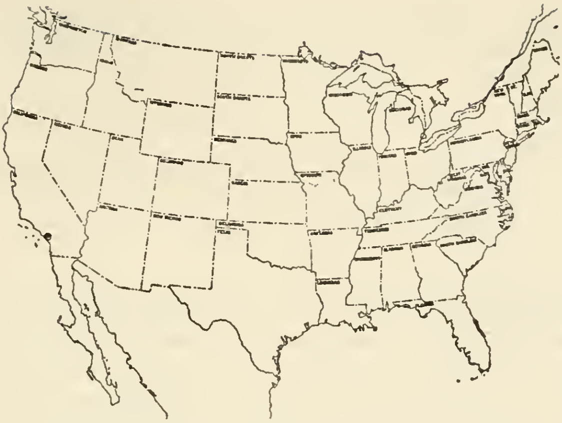


FIGURE 64.—Locality for *Dipogon calipterus nubifer.*

3b. *Dipogon (Deuteragenia) calipterus nubifer* (Cresson)

Pompilus (*Agenia*) *nubifer* Cresson, 1869, Proc. Boston Soc. Nat. Hist., vol. 12, p. 374, ♀. Lectotype: ♀, Orizaba, México (Philadelphia).

MALE: Unknown.

FEMALE: Thorax black; front leg entirely rufous; middle and hind legs blackish with rufous tinges on the tarsi and at some of the joints.

SPECIMENS: ♀, Garden Grove, Calif., Dec. 1928 (Washington). ♀ (lectotype), Orizaba, México (Philadelphia).

3c. *Dipogon (Deuteragenia) calipterus duplicatus*, new subspecies

MALE: Unknown.

FEMALE: Thorax rufous; front leg rufous; middle leg rufous, its femur mostly or apically infuscate, its tibia fuscous, and its tarsus

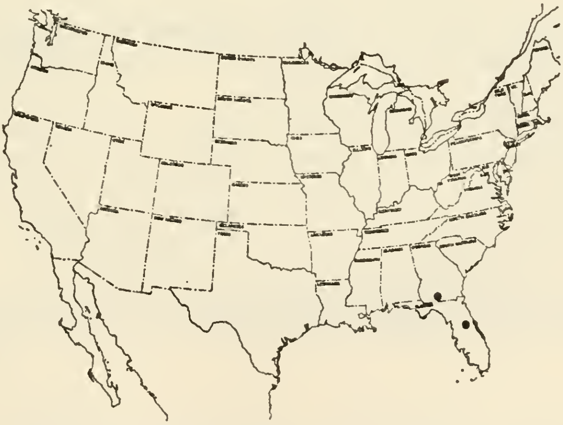


FIGURE 65.—Localities for *Dipogon calipterus duplicatus.*

infuscate basally and apically; hind coxa and trochanter rufous, the rest of the hind leg fuscous tinged with rufous, the hind femur basally almost clear rufous.

Type: ♀, Orlando, Fla., Mar. 1944, R. and G. Bohart (Washington, USNM 61794).

Paratype: ♀, Thomasville, Ga., Mar. 28, 1950 (Krombein).

4. *Dipogon (Deuteragenia) thoracicus*, new species

Male: Unknown.

Female: Forewing 5.7 to 7.0 mm. long; clypeus rather flat, its margin faintly reflexed, somewhat concave medially; mesoscutum subpolished, with very fine punctures; mesopleuron with very small, weak, adjacent punctures which give a mat appearance; propodeum medially rather mat, with weak small punctures separated by about 0.5 their diameter, these dispersed between fine, weak, irregular, transverse wrinkles; second tergite distinctly mat, with fine punctures separated by about 1.3 their diameter.

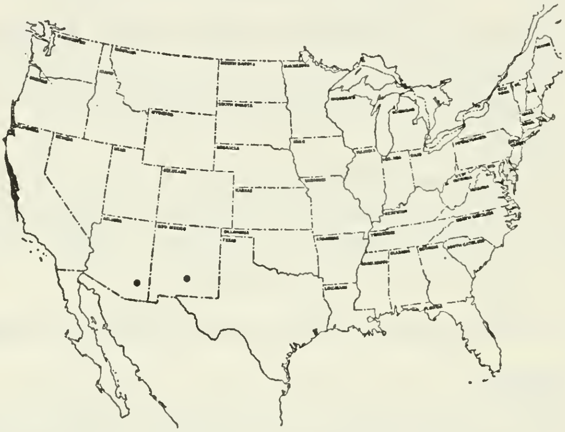


Figure 66.—Localities for *Dipogon thoracicus.*

Head blackish; clypeus except basally, mandible except basally, and antenna except basally rufous, the rest of these parts infuscate; thorax rufous; wings hyaline, marked with fuscous as in *D. calipterus;* legs blackish with ferruginous tinges; abdomen blackish.

Type: ♀, Rio Ruidoso, at 6,500 ft. in the White Mts., N. Mex., Aug. 1, C. H. T. Townsend (Washington, USNM 61691).

Paratype: ♀, Fort Grant, Pinaleno Mts., Ariz., July 15 to 19, 1917 (Ithaca).

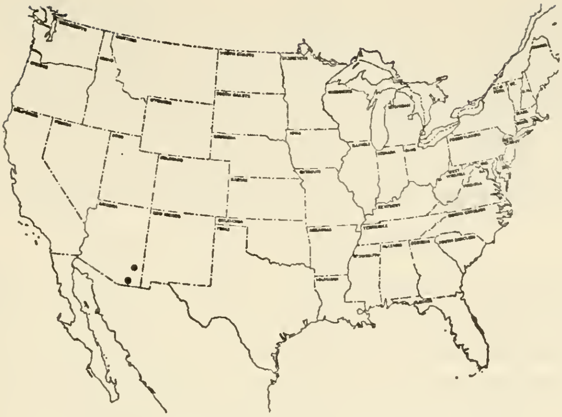


FIGURE 67.—Localities for *Dipogon iracundus.*

5. *Dipogon (Deuteragenia) iracundus*, new species

MALE: Unknown.

FEMALE: Forewing 7.4 mm. long; clypeus rather flat, with a weak median preapical swelling, the margin somewhat concave medially; mesoscutum mat, with very fine punctures; mesopleuron subpolished, with small dense punctures separated by about 0.2 their diameter; propodeum medially subpolished, with small sharp punctures separated by about 0.3 their diameter, these dispersed between weak, fine, irregular transverse wrinkles; second tergite weakly mat, with small punctures separated by about 1.3 their diameter.

Head black; apical 0.3 to 0.5 of mandible rufous; antenna rufous, infuscate basally, especially above; thorax rufous; wings hyaline, marked with fuscous as in *D. calipterus;* legs rufous, infuscate beyond the middle of their femora, this infuscation weakest on the foreleg and strongest on the hind leg; abdomen blackish, the first segment and sometimes (in the type but not in the paratype) basal 0.6 of the second segment rufous.

TYPE: ♀, Graham Mts., Ariz., Sept. 2, 1950 (Washington, USNM 61692).

PARATYPE: ♀, Ramsey Canyon, Huachuca Mts., Ariz., July 5, 1931, L. K. Gloyd (Ann Arbor).

6. *Dipogon (Deuteragenia) sericeus* Banks

Dipogon sericea Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 180, [♀]. Type: ♀, Bull Prairie, Camas Prairie Summit, 7,500 ft., Lake County, Oreg. (San Francisco).

MALE: Unknown.

FEMALE: Forewing 6 mm. long. According to the original description, this is a black species with the body and much of the head and basal portion of legs clothed with a dense appressed gray to yellowish pubescence. The forewing is brown, beyond the marginal cell snow-white, the marginal cell and below it darker than elsewhere. The maxillary hair basket is described as having "pale" bristles, but an examination of the type shows them to be blackish.

Specimen: ♀ (type), Bull Prairie, Camas Prairie Summit, 7,500 ft., Lake County, Oreg., July 22, Frewing (San Francisco).

7. *Dipogon (Deuteragenia) sayi* Banks

Male: Forewing 4.5 to 6.3 mm. long; apical part of clypeus somewhat impressed, its margin weakly reflexed; flagellar segments each with an angular subbasal swelling which gives the flagellum a notched or stepped appearance; first flagellar segment about 3.7 as long as wide; hooks on sixth sternite long, strong, curved inward and a little backward; subgenital plate broadly lanceolate, with an apical notch and a high blunt keel which is highest subbasally.

Black. Wings hyaline, marked with fuscous.

Female: Forewing 5.5 to 9 mm. long; clypeus with a strongly impressed, transverse, preapical trough, the margin appearing somewhat reflexed; mesoscutum subpolished, with small sharp punctures; mesopleuron subpolished, with small, rather weak punctures that are separated by about 0.3 their diameter; propodeum medially subpolished, with rather small, sharp punctures separated by about their diameter; second tergite subpolished, with small punctures separated by about 1.7 their diameter.

Black. Wings subhyaline, the forewing with two conspicuous fuscous bands, a narrow one along the basal vein and nervulus and a broad one beyond the middle of the stigma; apical margin of forewing and apical part of hind wing weakly infuscate.

There are two subspecies, which together cover most of the United States and southern Canada.

7a. *Dipogon (Deuteragenia) sayi sayi* Banks

Plate 1, figure 9

Dipogon sayi Banks, 1941, Canadian Ent., vol. 73, p. 122, [♂, ♀]. Lectotype: ♀, Falls Church, Va., July 24, N. Banks (Cambridge).

Male: Forewing with a narrow fuscous band along the basal vein and nervulus and a large fuscous area beyond the stigma; apical margin of forewing and apical part of hind wing weakly infuscate.

Female: Fuscous bands on forewing narrower and more sharply defined than in the subspecies *nigrior*, the basal transverse band narrowed at its hind end and occupying only about 0.3 of the first brachial cell, the apical band occupying about 0.6 of the second discoidal cell.

Specimens (34♂, 163♀): From Connecticut (Colebrook, East Haddam, East Hartford, Lyme, New Haven, and Wallingford); District

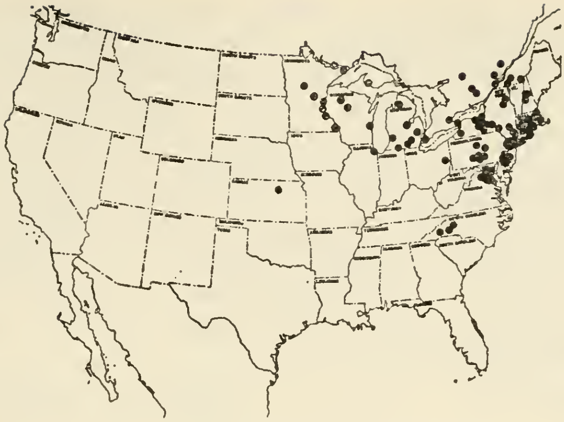


Figure 68.—Localities for *Dipogon sayi sayi.*

of Columbia; Illinois (Chicago); Kansas (Manhattan); Maryland, (Cabin John, Glen Echo, Plummers Island, Takoma Park, and Woodstock); Massachusetts (Cohasset, Forest Hills, Holliston, Lexington, Mount Tom, Sherborn, South Hadley, South Natick, and Stony Brook Reserve); Michigan (Ann Arbor, Branch County, Charlevoix County, Deerfield Township in Lapeer County, Huron Mts. in Marquette County, Midland County, and Muskegon County); Minnesota (Cascade River in Cook County, Garrison, Hastings, Houston County, Itasca Park, North Branch, and Washington County); New Hampshire (Groton and Randolph); New Jersey (Alpine, Clementon, Moorestown, Morris County, Ramsey, and Riverton); New York (Bemus Point, Cold Spring Harbor, Connecticut Hill in Tompkins County, Essex County, Fort Montgomery, Grand Island, Ithaca, Labrador Lake in Cortland County, McLean Reserve in Tompkins County, Millwood, North Fairhaven, Oneonta, Oswego, Port Jefferson, Syracuse, and Yonkers); North Carolina (Black Mt., Hamrick, and Mount Pisgah); Ohio (Salinaville); Ontario (Fisher Glen, Georgetown, Leamington, Ottawa, and Ridgeway); Pennsylvania (Camp Hill, Conewago, Dushore, Glenside, Harrisburg, Highspire, Hummelstown, Inglenook, Shiremanstown, and Spring Brook); Quebec (Abbotsford, Aylmer, Duchesnay, Fort Coulange, Hemmingford, Joliette, Kazubazua, Laniel, Montreal, and Megantic); Virginia (Arlington, Chain Bridge, Dunn Loring, Great Falls, and Falls Church); and Wisconsin (Hartland, Rib Mountain State Park, and Sawyer County).

Most dates of capture are in the summer months, though records for May and September are not rare. Unusually early and late dates are: May 1 at Ann Arbor, Mich.; May 14 at Plummers Island, Md.; May 20 at Spring Brook, Pa.; May 21 at New Haven, Conn.; May 28 at Ottawa, Ontario; Sept. 11 at Dunn Loring (near Vienna), Va.; Sept. 20 at Montreal, Quebec; Sept. 23 at Wakefield, Conn.; and Oct. 7 and 10 at Arlington, Va. Other biological notes with these specimens state that a female was taken on flowers of *Geranium maculatum;* that six different collections were made in woods; that three collections (1♂, 2♀) were made on tree trunks; that a female was reared from *Carya* wood at Syracuse, N. Y., July 6, 1918, by Blackman and Stage; and that a female was reared from *Celtis* wood at Plummers Island, Md., Apr. 25, 1908, by W. S. Fisher.

This is a common woodland subspecies of the Alleghenian and Carolinian faunas. It nests in dead wood, the females being commonly seen on stumps and dead tree trunks. Adults are on the wing from late spring to early fall.

7b. *Dipogon (Deuteragenia) sayi nigrior,* new subspecies

PLATE 2, FIGURE 28

MALE: Unknown.

FEMALE: Fuscous bands on forewing broader and more diffuse than in the subspecies *sayi,* the basal transverse band broadened at its hind end and occupying about 0.6 of the first brachial cell, the apical band occupying about 0.85 of the second discoidal cell.

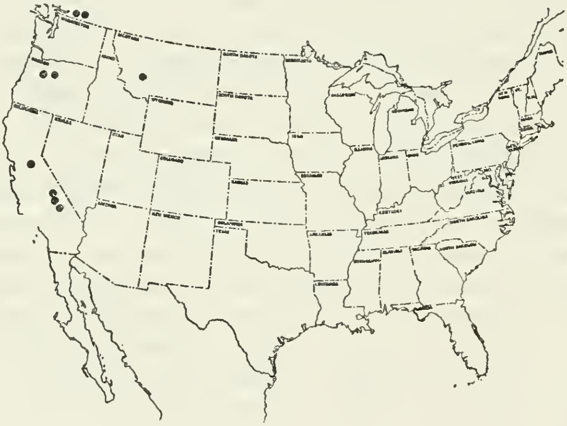


FIGURE 69.—Localities for *Dipogon sayi nigrior.*

TYPE: ♀, Pamelia Lake, Mount Jefferson at about 3,000 ft., Oreg., July 19, 1907 (Washington, USNM 61693).

PARATYPES: ♀, Agassiz, British Columbia, June 22, 1915, R. C. Treherne (Ottawa). ♀, Agassiz, British Columbia, July 6, 1927, H. H. Ross (Ottawa). ♀, Okanagan, British Columbia, August (Ottawa). ♀, Steelhead, British Columbia, July 14, 1933, H. B. Leach (Ottawa). ♀, Fish Camp, Calif., July 22, 1948, Townes family (Townes). ♀, Snowline Camp, El Dorado County, Calif., July 7, 1948, C. D. MacNeil (Berkeley). ♀, Sugar Pine, 4,300 to

5,500 ft., Madera County, Calif., Aug. 24 to 31, 1914, J. C. Bradley (Ithaca). ♀, near Glacier Point, 8,000 ft., Yosemite Park, Calif., July 17, 1948, Townes family (Townes). ♀, Colo., C. F. Baker (Washington). ♀, Helena, Mont., Sept. 1, 1907 (Cambridge). ♀, transporting *Xysticus* sp., Tajique, N. Mex., June 25, 1940, R. H. Beamer (Evans). ♀, Cascadia, Oreg., Aug. 11, 1924, H. A. Scullen (Corvallis).

This subspecies occurs in the Transition fauna.

Subgenus *Dipogon* Fox

Dipogon Fox, 1897, Proc. Acad. Nat. Sci. Philadelphia, 1897, p. 241. Type: *Dipogon populator* Fox; original designation.

Agriogenia Banks, 1919, Canadian Ent.. vol. 51, p. 83. Type: *Pompilus* (*Agenia*) *brevis* Cresson; original designation.

Forewing 2.3 to 4.8 mm. long; maxillary beard of female white to stramineous; second cubital cell about 1.3 as long as the third cubital cell (pl. 1, fig. 10).

There are several species of this subgenus in the southeastern states, and one (*brevis*) ranges north to Canada. Outside of the Nearctic region the subgenus is represented only in the Neotropics. There are two species groups as indicated in the key and the group descriptions.

Keys to the Nearctic species of the subgenus Dipogon

MALES

(Two of the three subspecies of *D.* (*D.*) *brevis* are known in the male sex. The males of the rest of the Nearctic species are unknown.)

1. Punctures on propodeum separated by an average of 0.8 or more their diameter range: Alleghenian fauna . . . . . 3a. **brevis recalvus,** new subspecies
   Punctures on propodeum separated by an average of 0.5 or less their diameter; range: Alleghenian and Carolinian faunas . . . 3b. **brevis brevis** (Cresson)

FEMALES

1. Frons and top part of pronotum without appressed pubescence, only with sparse, suberect setae; microtrichia on forewing much larger and denser on the transverse fuscous bands than between and basad of the bands. GRAENICHERI GROUP (SUBSPECIES OF GRAENICHERI) 2
   Frons and top part of pronotum with dense, appressed pubescence in addition to sparser suberect setae; microtrichia on forewing little larger and hardly denser on the transverse fuscous bands than between and basad of the bands. BREVIS GROUP 3
2. Head and thorax blackish; range: New Jersey to North Carolina. 5a. **graenicheri atratus,** new subspecies.
   Head and thorax fulvous; range: Florida to Louisiana. 5b. **graenicheri graenicheri** Banks
3. Head and abdomen blackish, the thorax largely rufous . . . 4. **texanus** Banks
   Head, abdomen, and thorax, blackish or pale, in either case concolorous . . 4

4. Frons, pronotum, and mesoscutum with dense appressed pubescence, the individual hairs long enough and close enough to overlap considerably. SUBSPECIES OF BREVIS 5
   Frons, pronotum, and mesoscutum with a sparse appressed pubescence, the individual hairs not long nor dense enough to overlap much 7
5. Metapleuron and propodeum partly or mostly polished or subpolished; punctures on propodeum separated by at least twice their diameter on a large portion of propodeum . . . . . . 3a. **brevis recalvus,** new subspecies
   Metapleuron and propodeum entirely mat; punctures on propodeum separated by less than twice their diameter, except sometimes in a narrow area adjacent to the metapleuron 6
6. Head, body, and legs entirely or mostly blackish; range: Alleghenian and Carolinian faunas . . . . 3b. **brevis brevis** (Cresson)
   Head, body, and legs ocherous; range: Austroriparian fauna. 3c. **brevis ochreus,** new subspecies
7. Hairs on propodeum and first tergite moderately dense, their bases separated from one another by about their length; forewing about 2.4 mm. long. 1. **pygmaeus,** new species
   Hairs on propodeum and first tergite very sparse, their bases separated from one another by several times their length; forewing about 3.3 mm. long. 2. **paludis,** new species

BREVIS GROUP

Frons and top part of pronotum with dense, appressed pubescence in addition to sparser suberect setae; microtrichia on forewing little larger and hardly denser in the transverse fuscous bands than between and basad of the bands.

The Neotropical *Dipogon ariel* Banks 1946 and *Dipogon alastor* Banks 1946 and all the Nearctic species but *graenicheri* belong to this group.

1. *Dipogon (Dipogon) pygmaeus*, new species

MALE: Unknown.

FEMALE: Forewing 2.3 mm. long; frons, upper part of pronotum, and mesoscutum mat, without noticeable punctures, with appressed

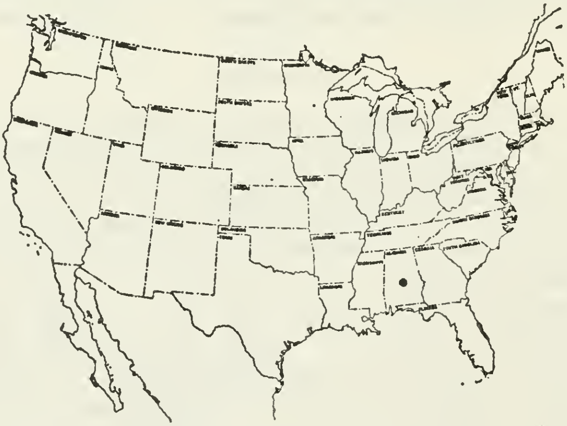


FIGURE 70.—Locality for *Dipogon pygmaeus*.

pubescence the hair sockets of which are separated by about 0.6 the length of the hairs; mesopleuron, metapleuron, propodeum, and second tergite weakly mat, without noticeable punctures, with pubescence the hair sockets of which are separated by about the length of the hairs; microtrichia on forewing of uniform length and distribution.

Brownish ferruginous, the basal half of the abdomen and tarsi except basally paler than the rest of the insect; wings pale yellowish, the forewing with fuscous areas arranged as in *D.* (*D.*) *brevis.*

This is the smallest species of Pepsinae known to me.

Type: ♀, Prattsville, Ala., July 21, 1930, Paul W. Oman (Lawrence).

2. *Dipogon* (*Dipogon*) *paludis*, new species

Male: Unknown.

Female: Forewing 3.4 mm. long; frons, upper part of pronotum, and mesoscutum strongly mat (the frons most strongly so), these parts with appressed pubescence the hair sockets of which are separated by about 0.6 their length; mesopleuron, metapleuron, and propodeum subpolished, with a very few scattered hairs set in small punctures; second tergite subpolished, with fine, weak punctures that are separated by about 3.0 their diameter.

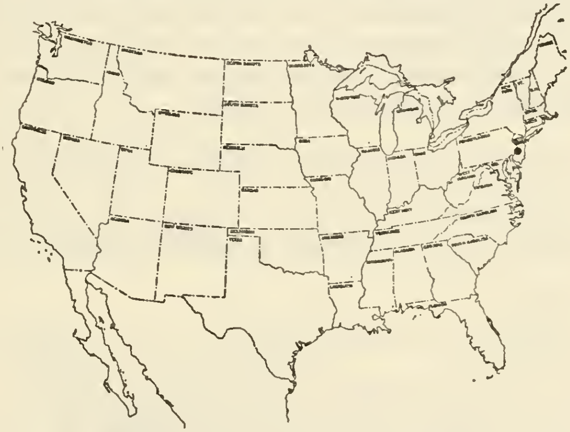


Figure 71.—Locality for *Dipogon paludis.*

Dark rufous. Head except clypeus and mouth parts blackish; pubescence on frons yellow; area between mesoscutum and propodeum blackish; fore and hind tibiae externally and their tarsi basally infuscate (hind leg lacking beyond the femur); wings weakly infuscate, the forewing with light fuscous areas distributed as in *D.* (*D.*) *brevis;* apical 0.3 of second abdominal segment and all of the third and fourth segments infuscate.

Type: ♀, Atsion, N. J., July 30, 1939, H. Townes (Townes). Taken in a swampy area.

3. *Dipogon* (*Dipogon*) *brevis* Cresson

Male: Forewing 3.2 to 4.6 mm. long; flagellar segments in profile each convex below, so that the flagellum has a somewhat nodose appearance; subgenital plate strongly compressed, with a sharp high median longitudinal ridge which gives it a lanceolate shape in profile. Sculpture a little smoother and pilosity a little shorter than in the female.

Female: Forewing 3.8 to 5.2 mm. long; frons, upper part of pronotum, and mesoscutum very strongly mat, without noticeable punctures, with appressed dense pubescence, the hair sockets of which are separated by about 0.3 the length of the hairs; mesopleuron mat, without noticeable punctures, with dense appressed pubescence, the hair sockets of which are separated by about 0.5 the length of the hairs; sculpture and pubescence of metapleuron and propodeum variable; second tergite mat, with dense appressed pubescence arising from weak punctures that are separated by about 0.3 their diameter.

Coloration of both sexes black to ochraceous, according to the subspecies. Wings of female subhyaline, the forewing somewhat infuscate basally, in a band at the level of the basal vein, in a broad area extending from the base of the stigma to the apex of the third cubital cell, and a little infuscate along the apical margin (pl. 1, fig. 10). Wings of male a little more hyaline than in the female and with the fuscous areas paler and a little less extensive.

3a. *Dipogon* (*Dipogon*) *brevis recalvus*, new subspecies

Male: Metapleuron subpolished, with weak fine punctures separated by about 2.5 their diameter; propodeum moderately mat to

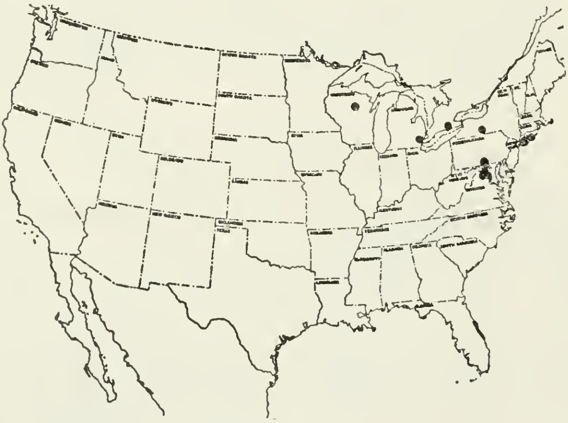


Figure 72.—Localities for *Dipogon brevis recalvus.*

subpolished, with punctures separated by an average of about 1.0 their diameter.

Black. Flagellum beneath, fore tarsus, front of fore tibia, and front of fore femur apically tinged with fulvous.

FEMALE: Metapleuron subpolished, with a few or very few scattered small punctures; propodeum mat to polished, with numerous punctures medially and few or very few laterally.

Black. Mandible except basally, rarely the clypeus and face next to the eyes, more or less of the flagellum, more or less of the front legs (especially the tarsus), and middle and hind tarsi except basally, more or less distinctly tinged with fulvous.

TYPE: ♀, La Trappe, Quebec, July 13, 1948, J. Ouellett (Washington, USNM 61694).

PARATYPES: ♀, Deerfield Township, Lapeer County, Mich., July 4, 1937, G. Steyskal (Ann Arbor). ♂, Coram, Long Island, N. Y., July 18, 1937, K. V. Krombein (Krombein). ♀, Huntington, Long Island, N. Y., Sept. 12, 1926, F. M. Schott (Townes). ♀, Orient, Long Island, N. Y., Aug. 14, 1929, Roy Latham (Washington). ♀, Springs, N. Y., July 16, 1918 (Cambridge). ♂, Simcoe, Ontario, June 22, 1939, G. E. Shewell (Ottawa). ♀, Arendtsville, Pa., June 28, 1927, S. W. Frost (Ithaca). ♀, Falls Church, Va., June 10, N. Banks (Cambridge). ♀, Great Falls, Va.; July 15, N. Banks (Cambridge). ♀, Rib Mountain State Park, Wis., Aug. 27, 1937, L. R. Penner (St. Paul). ♀, no data (Cambridge).

This subspecies occurs mostly in the Alleghenian fauna.

3b. *Dipogon (Dipogon) brevis brevis* (Cresson)

PLATE 1, FIGURE 10

Pompilus (Agenia) brevis Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 123, ♂. Type: ♂, Georgia (Philadelphia).

MALE: Metapleuron mat, with weak fine punctures separated by about 1.2 their diameter; propodeum mat, with punctures that are separated by an average of about 0.4 their diameter.

FEMALE: Metapleuron mat, or next to the propodeum often subpolished, with numerous small scattered punctures; propodeum quite mat, with close, usually indistinct punctures all over or the punctures somewhat sparser next to the metapleuron.

Coloration of both sexes black, but with a grayish cast due to a dense appressed grayish pubescence. Mandible except basally, often the clypeus and front orbit, more or less of the flagellum, often the under side of coxae, more or less of front legs (especially the tarsus) and middle and hind tarsus except basally, more or less tinged with fulvous.

Specimens: ♀, Canton, Conn., Aug. 20, 1936, B. J. Kaston (Washington). ♀, East Hartford, Conn., Sept. 11, 1948, H. E. Evans (Evans). ♀, Glen Echo, Md., June 16, 1919, Fouts (Washington). ♀, Holliston, Mass., Aug. 14, N. Banks (Cambridge). ♀, in woods, Ithaca, N. Y., June 18, 1947, H. E. Evans (Evans). 3♀, at flowers of *Pastinaca sativa*, Ithaca, N. Y., July 5 and 6, 1947, H. E. Evans (Evans). ♀, Ithaca, N. Y., Sept. 19, 1940, J. N. Belkin (Ithaca). ♀, Farmingdale, N. Y., Aug. 1, 1938, H. and M. Townes (Townes). ♂, Taughanic Falls, N. Y., Aug. 21, 1925 (Ithaca). ♂, Black Mt., N. C., May (Cambridge). ♂, Mount Pisgah, 4,600 ft., N. C., Sept. 2, 1950, H. and D. Townes (Townes). 2♀, Wake County, N. C., July 7, 1950, and Sept. 12, 1950, H. and M. Townes (Townes). ♀, Carlisle, Pa., July 25, 1920, C. C. Hill (Washington). ♀, Aldie, Va., May 8, 1948, G. F. Townes (Townes). ♀, Arlington, Va., Aug. 31, 1947, K. V. Krombein (Krombein). ♂, Falls Church, Va., July 14, N. Banks (Cambridge).

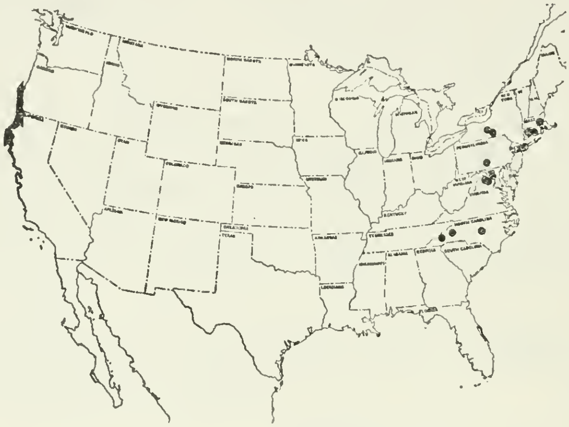


Figure 73.—Localities for *Dipogon brevis brevis*.

The two females taken at flowers of *Pastinaca sativa* by H. E. Evans at Ithaca, N. Y., July 6, 1947, are accompanied by the note that these and a few other specimens were walking along the stems just below the umbels, holding the wings more or less erect, and fanning them. They looked much like otitid flies, the bands on the wings increasing the resemblance.

This subspecies occurs in the Carolinian fauna and the warmer parts of the Alleghenian fauna. Its usual habitat seems to be dry deciduous woods where the females may be found running along the twigs and small branches of shrubs and understory trees. In appearance, habitat, and manner of walking they look much like certain species of *Camponotus* (Formicidae).

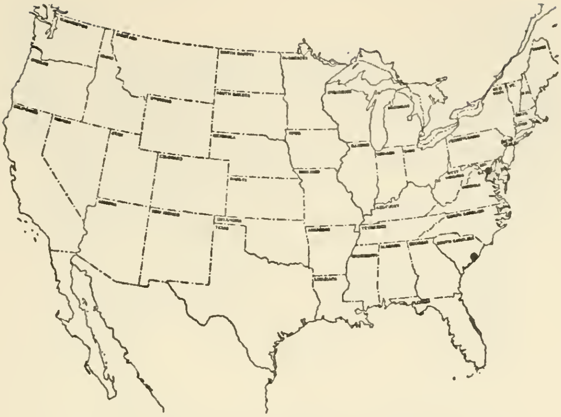


Figure 74.—Localities for *Dipogon brevis ochreus.*

3c. *Dipogon (Dipogon) brevis ochreus*, new subspecies

Male: Unknown.

Female: Forewing 4.5 to 4.7 mm. long; sculpture and pilosity similar to those of *D.* (*D.*) *brevis brevis.*

Ocherous. Pubescence ocherous; wings with an ocherous tinge.

Type: ♀, taken while dragging a half-grown *Phidippus* (?) female over a log, Lexington Park, Md., Sept. 5, 1951, O. L. Cartwright (Washington, USNM 61695).

Paratype: ♀, McClellanville, S. C., May 10, 1944, H. Townes (Townes).

This pale-colored subspecies occurs in the Austroriparian fauna.

4. *Dipogon (Dipogon) texanus* Banks

Dipogon texanus Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 179, [♀]. Type: ♀, Brownsville, Tex. (Cambridge).

Male: Unknown.

Female: Forewing 2.6 to 3.0 mm. long. Structure similar to that of *D.* (*D.*) *brevis.* The type is sculptured like *D.* (*D.*) *brevis brevis*, while a second specimen is sculptured like *D.* (*D.*) *brevis recalvus.*

Black. Clypeus, mouth parts, antenna except at the joints, thorax except behind the wing roots and on the under side of the meso- and metathorax, fore coxa except for a small apical area, middle and hind coxae except above, front and under sides of fore femur and tibia, fore tarsus, and middle and hind tarsi apically, rufous. Wing markings as in *D.* (*D.*) *brevis*, but sharper and darker.

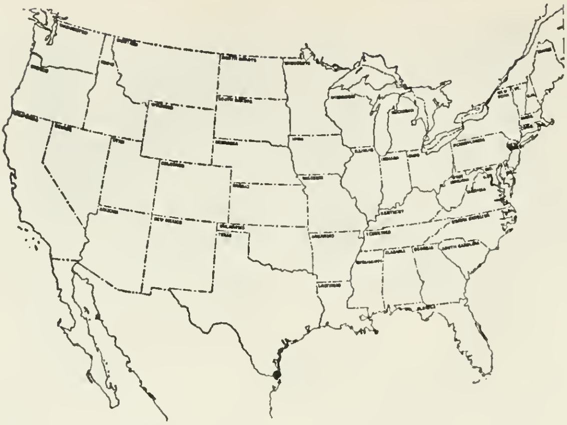


FIGURE 75.—Locality for *Dipogon texanus*.

SPECIMENS: ♀ (type), Brownsville, Tex., June 11 to 16, 1933, P. J. Darlington (Cambridge). ♀, Brownsville, Tex., May 1, 1904, H. S. Barber (Washington).

GRAENICHERI GROUP

Frons and top part of pronotum without appressed pubescence, only with sparse, suberect setae; microtrichia on forewing much larger and denser within the transverse fuscous bands than between and basad of the bands.

The only known species of this group is the Nearctic *graenicheri*.

5. *Dipogon* (*Dipogon*) *graenicheri* Banks

MALE: Unknown.

FEMALE: Forewing 4.1 to 4.8 mm. long; frons, upper part of pronotum, and mesoscutum subpolished or sometimes (in the paratype of the subspecies *atratus*) rather mat, the frons and upper part of pronotum with sparse, long, scattered setae coming from punctures separated from one another by an average of about 4.0 their diameter; mesoscutum with dense punctures over most of its surface, or the punctures more or less restricted to its hind 0.25; mesopleuron, metapleuron, and propodeum subpolished, with scattered, very sparse punctures; second tergite subpolished, with small weak punctures that are separated from one another by about 2.5 their diameter.

Blackish or fulvous, according to the subspecies, wings hyaline, the forewing with a narrow transverse fuscous band at the basal vein and a broad transverse fuscous band between the base of the stigma and the apex of the third cubital cell (pl. 2, fig. 29).

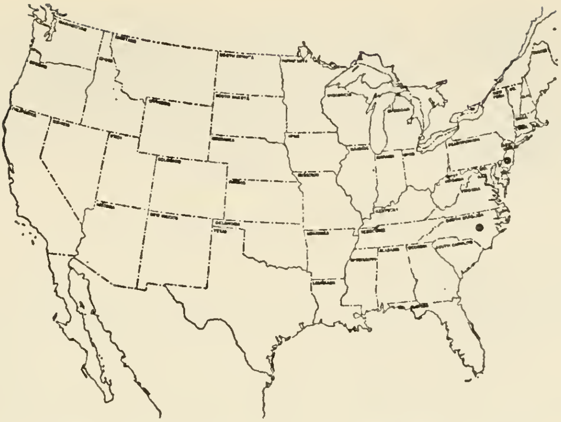


Figure 76.—Localities for *Dipogon graenicheri atratus.*

5a. *Dipogon (Dipogon) graenicheri atratus*, new subspecies

Plate 2, figure 29

Male: Unknown.

Female: Black. Apical part of the clypeus sometimes, apical part of mandible, most of antenna, front legs, and the middle and hind tarsi except basally, tinged with fulvous.

Type: ♀, Wake County, N. C., June 18, 1949, H. Townes (Townes).

Paratype: ♀, Chesilhurst, N. J., June 25, 1939, H. Townes (Townes).

5b. *Dipogon (Dipogon) graenicheri graenicheri* Banks

Dipogon graenicheri Banks, 1939, Canadian Ent., vol. 71, p. 230, [♀]. Lectotype: ♀, South Miami, Fla., May 16, S. Graenicher (Cambridge).

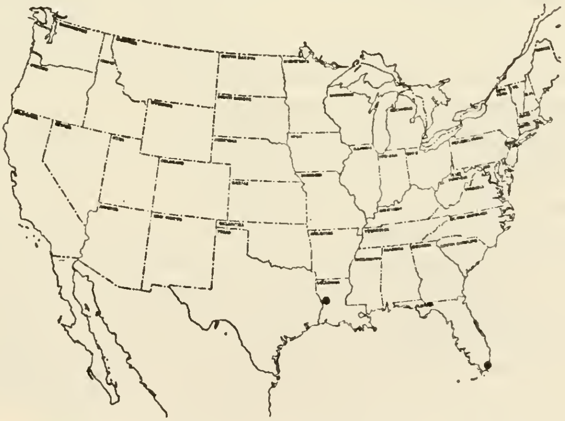


Figure 77.—Localities for *Dipogon graenicheri graenicheri.*

MALE: Unknown.

FEMALE: Fulvous. Apical third to two-thirds of second abdominal segment and the third and following segments infuscate.

SPECIMENS: 2 ♀ (lectotype and paratype) South Miami, Fla., Mar. 20 and May 16, S. Graenicher (Cambridge). ♀., Frierson, La., Apr. 21, 1909, E. S. G. Titus (Washington).

Tribe Macromerini

Cubital vein of forewing not quite reaching wing margin (pl. 1, fig. 11); hind tibia most frequently smooth, though in some females with an external dorsal serration; first abdominal tergite rather slender, somewhat constricted subbasally so that at least in females its sides are subbasally concave when seen from above; suture or fold separating epipleuron of first abdominal segment from the tergite usually absent; last tergite of male usually with a large whitish spot; parapenial lobe of male genitalia apically decurved to form a hook.

This tribe includes many small, slender species and a few middle sized ones. The Old World genus *Macromeris* contains large, rather robust species. Many of them, including all species of the Nearctic genera *Auplopus* and *Phanagenia*, make mud cells for nests. The nesting habits of the other two Nearctic genera (*Ageniella* and *Priocnemella*) are practically unknown. A curious propensity of this group of wasps is to cut off all or most of the legs of the prey before transporting it to the nest.

Key to the Nearctic genera of Macromerini

1. First tergite with a fine lateral crease that separates off the epipleuron; propodeum without long erect hairs; mentum of female with a brush of about 20 long stout bristles which are not divided into right and left groups; underside of last tarsal segment of female with preapical bristles. **Phanagenia** (p. 141)

   First tergite without a lateral crease; propodeum with or without long erect hairs; mentum of female with either slender hairs, or with stout bristles that are divided basally into right and left groups 2

2. Propodeum with long erect hairs; female with a bare pygidial area and with some strong bristles arising from the mentum; male subgenital plate rather large, with a high, sharp, longitudinal ridge . . . . . **Auplopus** (p. 143)

   Propodeum usually without long erect hairs; female without a pygidial area and with only slender hairs arising from the mentum; male subgenital plate smaller, or its longitudinal ridge (when present) lower and more blunt . . 3

3. Apex of front tibia on the hind side without a conspicuously larger or recurved spinelike bristle; clypeus without a troughlike impression paralleling its lateroapical margin . . . . **Ageniella** (p. 167)

   Apex of front tibia on the hind side surmounted by a conspicuously larger and recurved spinelike bristle (best developed in the female); clypeus with a troughlike impression paralleling its lateroapical margin. **Priocnemella** (p. 219)

Genus *Phanagenia* Banks

Phanagenia Banks, 1933, Psyche, vol. 40, p. 18. Type: (*Phanagenia osceola* Banks) = *bombycina* Cresson; original designation.

Clypeus of male with a specialized apical margin, of female large, convex, and with the apex projecting as a broadly rounded lobe as in *Auplopus;* mentum of female with a brush of about 20 long stout setae which are not parted into right and left groups; front tibia without one of its apical bristles specialized; dorsal edge of hind tibia smooth; last tarsal segment without distinct preapical bristles beneath in the male, but with them in the female; propodeum without long erect hairs; first tergite with a fine line or fold separating off the epipleuron; female with an oval, bare pygidial area.

Phanagenia is close to the large and variable genus *Auplopus*, but in the Western Hemisphere, where it is represented only by the genotype, it is distinct in the characters mentioned in the key. Old World species that might be referable to *Phanagenia* are as follows: An undetermined African species represented in Cambridge by two females seems to be a typical *Phanagenia;* the Madagascan *Agenia macula* Saussure 1891, as represented by both sexes in Cambridge (determined by Banks), may be a *Phanagenia* but the mental bristles of the female are rather sparse and male clypeus simple; the Australian *Fabriogenia incompta* Banks 1941, represented by the female type in Cambridge, has the mental bristles and bristles on the under side of the fifth tarsal segments as in *Phanagenia*, but lacks the suture separating the epipleuron of the first tergite.

Phanagenia bombycina (Cresson)

Pompilus (*Agenia*) *bombycinus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 125, ♂, ♀. Lectotype: ♀, West Virginia (Philadelphia).

Ageniella annecta Banks, 1911, Journ. N. Y. Ent. Soc., vol. 19, p. 233, ♀. Type: ♀, Falls Church, Va. (Cambridge).

Phanegenia osceola Banks, 1933, Psyche, vol. 40, p. 18, ♀. Type: ♀, Miami, Fla. (Cambridge).

Biology: Walsh and Riley, Amer. Ent., 1869, vol. 1, pp. 131–133, 136, 163.—Peckham, 1898, On the instincts and habits of the solitary wasps, Wisconsin Geol. Nat. Hist. Surv. Bull. 2, pp. 164–165; 1905, Wasps social and solitary, pp. 244–247.—Savin, 1924, Nat. Hist., vol. 24, pp. 520–522.

Male: Forewing about 8 mm. long. Structure as indicated for the genus, the distorted clypeus being particularly distinctive. Black. Wings subhyaline, the forewing weakly infuscate apically.

Female: Forewing about 9 mm. long. Structure as indicated for the genus. Wings weakly to strongly infuscate, the hind wing a little paler than the forewing.

The depth of infuscation on the wings is correlated with size (darkest in the largest specimens) and distribution (darkest in the specimens from farthest south). Somewhat similar correlations of the depth of wing infuscation with size and distribution occur in the species *Priocnessus nebulosus*.

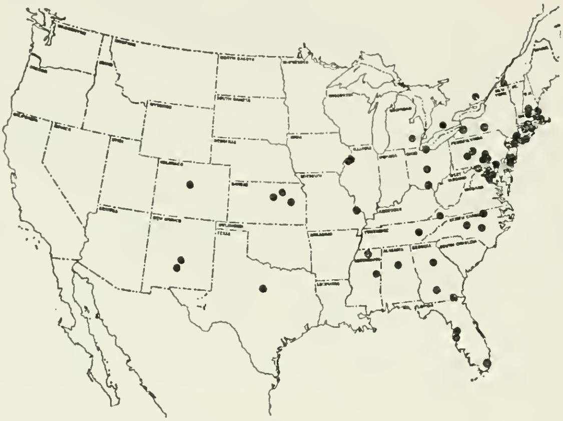


Figure 78.—Localities for *Phanagenia bombycina*.

Specimens (39♂, 110♀): From Alabama (Birmingham); Colorado (Lyons); Connecticut (East Hartford, Lyme, and New Haven); District of Columbia (Washington); Florida (Brooksville, Miami, and Pasco County); Georgia (Atlanta, Billys Island in the Okefenokee Swamp, and Tifton); Illinois (Moline, Ramsay County, and Rock Island); Kansas (Lawrence, Manhattan, and Onaga); Maryland (Beltsville, Edgewood, and Glen Echo); Massachusetts (Boston, Forest Hills, Stony Brook, Taunton, and Winchester); Mississippi (Agricultural College and Holly Springs); Missouri (Kirkwood); New Hampshire (Jaffrey); New Jersey (Camden, Greenwood Lake, Maurice River at Vineland, Moorestown, and Palisades); New Mexico (Cloudcroft and Rio Ruidoso at 6,000 ft. in the White Mts.); New York (Boston, Brooklyn, Huntington, Ithaca, and Wyandanch); North Carolina (Liberty, Raleigh, and Wise); Ohio (Columbus, Put in Bay, and Scioto County); Ontario (Marmora); Pennsylvania (Harrisburg, Highspire, Indiana, Linglestown, Pittsburgh, and Rockville); Quebec (Aylmer and Hemmingford); Tennessee (Jefferson City); Virginia (Dunn Loring, Falls Church, and Jones Creek in Lee County); West Virginia (Bolivar); and Costa Rica (Limón).

Most dates of capture are from June 1 to Sept. 15. Unusually early and late records are: Feb. 20 at Brooksville, Fla.; Mar. 1 at Eastland, Tex.; May 8, 12, and 13 at Columbus, Ohio; May 13 at Atlanta, Ga.; June 1 at Lyme, Conn., and at Boston, Mass.; Oct. 12 at Huntington, N. Y.; Oct. 29 at Manhattan, Kans.; and Nov. 11 at Raleigh, N. C.

Rearing records are as follows: 2♂, emerged June 1, 1918, Lyme, Conn., W. S. Fisher. ♂, emerged July 22, 1919, Falls Church, Va., R. A. St. George. ♀, emerged May 1902, Raleigh, N. C., F. Sherman. 2♀, emerged from mud nest found under a stone, Aug. 20, 1916, Greenwood Lake, N. J. 2♀, emerged Apr. 12 and 13, 1939 (no further data). ♂, emerged Apr. 16 from material collected Nov. 6, Harrisburg, Pa. 2♀ emerged May 2, and 26, respectively, from material collected Oct. 16, Indiana, Pa. 2♀, emerged May 1926 from nest found under a bridge, Wyandanch, N. Y., F. M. Schott. ♂, emerged July 30, 1883, from mud nest found under a stone, Va. ♀, emerged Apr. 25, 1889, from nest found under a stone Aug. 1888, Va. 2♂, emerged Apr. 1 and 6, 1909, and ♀, emerged Apr. 17, 1909, from nest collected Feb. 21, 1909, Linglestown, Pa. ♀, emerged Apr. 27, 1911, from nest collected Feb. 26, 1911, New Haven, Conn., A. B. Champlain. ♀, emerged Apr. 4, 1909, from nest collected Feb. 28, 1909, Rockville, Pa.

Flower records include *Ceanothus americanus* and *Vicia* near *pulchella.* A female taken at Manhattan, Kans., Oct. 28, 1949, by R. Fischer was transporting a young lycosid with all legs cut off. Peckham (1905) records "*Lycosa kochii*" and *Maevia vittata* as prey.

This species occurs from the Atlantic to the Rocky Mountains, as far north as Quebec and south to Costa Rica. Its nest of mud cells is placed usually under stones. Most adults are on the wing from June 1 to Sept. 15. Walsh and Riley, and Peckham have reported on the biology.

Genus *Auplopus* Spinola

Auplopus Spinola, 1841, Ann. Soc. Ent. France, vol. 10, p. 108. Type: *Pompilus femoratus* Fabricius; monobasic.

Aoplopus Agassiz, 1846, Nomenclator zoologici index universalis, pp. 27, 41 (emendation).

Pilpomus Costa, 1859, Fauna del Regno di Napoli, I menotteri aculeati, Pompilidea, p. 3. Type: *Sphex carbonarius* Scopoli; designated by Pate, 1946.

Pseudagenia Kohl, 1884, Verh. zool.-bot. Ges. Wien, vol. 34, pp. 38, 42. Type: *Sphex carbonarius* Scopoli; original designation.

? *Stenagenia* Saussure, 1892, *in* Grandidier, Histoire physique, naturelle et politique de Madagascar, vol. 20 (hyménoptères), pt. 1, pp. 307, 338. Type: (*Stenagenia pedunculata* Saussure) = *taeneatus* Saussure; designated by Pate, 1946.

? *Schizagenia* Cameron, 1910, *in* Wissenschaftliche Ergebnisse der Schwedischen zoologischen Expedion nach dem Kilimandjaro . . . , pt. 2, No. 8 (Hymenoptera, 7 Fossores), p. 256. Type: *Schizagenia carinigena* Cameron; monobasic.

Tumagenia Banks, 1934, Proc. Amer. Acad. Arts. Sci., vol. 69, pp. 39, 67 (new synonymy). Type: *Tumagenia iris* Banks; monobasic.

Calagenia Banks, 1934, Proc. Amer. Acad. Arts. Sci., vol. 69, pp. 40, 72 (new synonymy). Type: *Calagenia hermosa* Banks; original designation.

Lophagenia Banks, 1934, Proc. Amer. Acad. Arts Sci., vol. 69, pp. 40, 74 (new synonymy). Type: *Pseudagenia erigone* Bingham; original designation.

Clypeus of male of moderate size, its apical edge usually truncate but sometimes variously specialized; clypeus of female large, convex, the apex somewhat prolonged as a broadly rounded lobe; mentum of female with a group of about 6 to 16 long stout setae which are parted basally into right and left groups; front tibia without one of its apical bristles specialized; dorsal edge of hind tibia smooth; last tarsal segment without preapical bristles beneath; propodeum nearly always (always in the Nearctic species) with long sparse erect hairs; first tergite without a line separating off the epipleuron; female with an oval hairless pygidial area; male subgenital plate rather large, with a high sharp longitudinal ridge.

Spinola included only one species in his genus *Auplopus*, the Fabrician *Pompilus femoratus*. He noted some disagreements in color between his specimens and Fabricius' description of *femoratus*, but nevertheless referred them to this species. Richards (1937, The generic names of British insects, vol. 5, p. 126) states that Spinola's "variety" of *femoratus*, rather than *femoratus* itself, is the type of *Auplopus* and Pate (1946, Trans. Amer. Ent. Soc., vol. 72, p. 76) concurs. It seems clear, however, that for nomenclatorial purposes the one species originally included was Fabricius' *Pompilus femoratus*, and this must be the type species.

The original description of *Pompilus femoratus* is not sufficient for a modern generic assignment, but Dahlbom (1843–45, Hymenoptera Europaea . . . , vol. 1) examined the type and indicated its generic characters in the following way: On page 93 (1843) he describes *Agenia fulvipes* from females from Pennsylvania and South Carolina, mentioning the polished pygidium and clypeal shape so characteristic of the present genus. On page XIX (1845?) he states that he has studied the type of *Pompilus femoratus*, and on page 455 (1845) he synonymizes his *fulvipes* with *femoratus*, thus indicating that the type of *femoratus* had the pygidial area and clypeal shape he described for *fulvipes* and that otherwise the types appeared conspecific to him. Dahlbom's *fulvipes* can be none other than the Nearctic species *mellipes* Say, but I suspect that *femoratus* (described from South America) is a distinct though closely related species. The original description of *femoratus* states that the femora are ferruginous and the rest of the legs blackish. In *mellipes mellipes* the legs beyond the coxae are entirely ferruginous. There are several common Neotropical species which greatly resemble *mellipes* but which differ from it in the leg colors called for in the description of *femoratus*.

Auplopus is a very large genus, best represented in the warmer parts of the world. In the Old World tropics the species have much structural diversity and Banks has considered some of the more conspicuous segregates genera, as indicated in the synonymy above.

The New World species have more structural uniformity. There are many species in the Neotropic region and a large portion of the Nearctic species are intrusions from that area. It has not been possible to separate our species into sharply defined groups, but the following resemblances might be pointed out: *A. flavicoxae, inermis, variolarum,* and *adjunctus* agree in the polished female pygidium, lack of bluish iridescence, fulvous femora and tibiae, and unspecialized mandible and clypeal margin of the male. *A. mellipes* and *mexicanus* agree in the mat female pygidium, lack of bluish iridescence, bent mandible of the male, and thickened apical margin of the male clypeus. *A. mollis, caerulescens, architectus,* and *nigrellus* agree in the polished female pygidium, presence of bluish iridescence, and the unspecialized mandible and clypeal margin of the male.

Probably all species of the genus nest in mud cells and the characteristic mental bristles and large clypeus of the female are presumed to aid in carrying mud pellets for nest construction. Absence of teeth on the outside of the hind tibia seems to be another structural character correlated with these nesting habits, but the functional reason is not entirely clear. Possibly the tibial teeth when present, aid in digging or in pushing into and out of nest tunnels in the ground and, if so, would not be needed in species making nests of mud cells.

Keys to the Nearctic species of Auplopus

MALES

(Males of *variolarum, inermis, mollis,* and *mellipes meridianus* are unknown.)

1. Pronotum margined with white on its hind edge and most of its front edge; first tergite and coxae fulvous . . . . 4. **adjunctus** (Banks)
   Pronotum not margined with white; first tergite and often the coxae black or blackish 2
2. Clypeus with part of its apical edge much thickened (see from below); mandible much more strongly curved at the middle than elsewhere 3
   Clypeus with its apical edge thin; mandible evenly curved throughout . . 5
3. Apical edge of clypeus with a large rounded notch on each side of the middle; face black, with a white vertical line adjacent to the eye; seventh tergite without a conspicuous white spot . . . . 6. **mexicanus** (Cresson)
   Apical edge of clypeus without notches; face white, with or without a small median dark area; seventh tergite with a conspicuous white spot. SUBSPECIES OF MELLIPES 4
4. Middle and hind femora and tibiae fulvous . . . 5a. **mellipes mellipes** (Say)
   Middle and hind femora and tibiae black.
   5c. **mellipes variitarsatus** (Dalla Torre)
5. Coxae entirely fulvous; thorax black, without iridescence.
   1. **flavicoxae** (Banks)
   Coxae blackish or largely so; thorax blackish, with a distinct bluish or greenish iridescence 6

6. Penultimate segment of flagellum about 1.9 as long as wide; more than 0.6 of the face white; squama narrower and with a stronger median ventral protuberance. SUBSPECIES OF CAERULESCENS 7
Penultimate segment of flagellum about 1.65 as long as wide; less than 0.4 of the face white; squama broader and with a weaker median ventral protuberance. 9
7. Front and middle femora mostly blackish or brown.
8a. **caerulescens subcorticalis** (Walsh)
Front and middle femora fulvous 8
8. Middle and hind coxae entirely blackish or brown.
8b. **caerulescens caerulescens** (Dahlbom)
Middle and hind coxae about half fulvous, the rest infuscate.
8c. **caerulescens floridanus** (Banks)
9. Clypeus white on each side, black in the middle . . . 10. **nigrellus** (Banks)
Clypeus entirely black. SUBSPECIES OF ARCHITECTUS. 10
10. Wings faintly infuscate; range: Pacific States, British Columbia, Nevada, and parts of New Mexico . . . . . 9a. **architectus metallicus** (Banks)
Wings very faintly infuscate; range: Atlantic west to Colorado, and Arizona.
9b. **architectus architectus** (Say)

FEMALES

1. Pygidial area mat 2
Pygidial area polished 5
2. Depressions of pronotum with cross wrinkles; second flagellar segment about 6.4 as long as wide; forewing 10.7 to 12.0 mm. long; front trochanter entirely fulvous; range: Arizona and Mexico . . . 6. **mexicanus** (Cresson)
Depressions of pronotum smooth, without cross wrinkles; second flagellar segment about 4.8 as long as wide; forewing 6.5 to 9.0 mm. long; front trochanter usually more or less infuscate; range: Atlantic to 100° west longitude. SUBSPECIES OF MELLIPES 3
3. Middle and hind femora and tibiae black; range: eastern North America north of 42° latitude . . . . . 5c. **mellipes variitarsatus** (Dalla Torre)
Middle and hind femora and tibiae fulvous 4
4. Middle and hind coxae entirely blackish; range: eastern United States south of 42° latitude, but not including southern Florida.
5a. **mellipes mellipes** (Say)
Middle and hind coxae largely ferruginous; range: southern Florida.
5b. **mellipes meridianus**, new subspecies
5. Thorax dull black, without iridescence 6
Thorax dark with a definite bluish or greenish iridescence. 9
6. Coxae black 7
Coxae fulvous. 8
7. Middle and hind trochanters infuscate; pygidial area with medium sized punctures separated by about 1.7 their diameter; wings subhyaline.
3. **variolarum**, new species
Middle and hind trochanters fulvous; pygidial area with small weak punctures separated by about 5.0 their diameter; wings pale brown.
2. **inermis**, new species
8. Pubescence of head and thorax unusually dense, the setiferous punctures of the pleura so close that they are confluent in rows; flagellum light brown, elongate, its second segment about 7.3 as long as wide; wings subhyaline.
1. **flavicoxae** (Banks)
Pubescence of head and thorax not unusually dense, the setiferous punctures of the pleura distinct from one another; flagellum blackish, not unusually elongate, its second segment about 6.0 as long as wide; wings weakly to strongly infuscate . . . . 4. **adjunctus** (Banks)

9. Femora and tibiae entirely ferruginous; pubescence of head and thorax quite dense and fine . . . . 7. **mollis**, new species
 Femora and tibiae, or at least the middle and hind tibiae blackish; pubescence of head and thorax a little less dense. 10

10. First tergite usually with long suberect hairs on its apical half as well as on its basal half; second segment of cubital vein about 0.95 as long as the third segment (pl. 2, fig. 30); a slightly larger species with a little more long suberect hair and a little denser and finer sculpture. Not always distinguishable from the following two species in the female. SUBSPECIES OF ARCHITECTUS 11
 First tergite without or with a very few long suberect hairs on its apical half; second segment of cubital vein about 0.85 as long as the third segment (pl. 1, fig. 11); slightly smaller species with a little less long suberect hair and a little sparser and coarser sculpture. Not always distinguishable from *architectus* in the female 12

11. Wings weakly infuscate; blue iridescence of head and thorax a little darker; suberect pubescence a little sparser; size averaging a little smaller; range: Pacific States, British Columbia, Nevada, and parts of New Mexico. 9a. **architectus metallicus** (Banks)
 Wings subhyaline or faintly infuscate; blue iridescence of head and thorax a little lighter; suberect pubescence a little denser; size averaging a little larger; range: Atlantic west to Colorado and Arizona. 9b. **architectus architectus** (Say)

12. Pubescence of head and thorax a little sparser and the individual hairs apparently a little less broadened basally so that the pubescence has a little less of a silvery sheen; punctation of frons a little sparser and coarser; maxillary palpus blackish, at least basally; all femora blackish. Not always distinguishable from specimens of *caerulescens* with dark femora. 10. **nigrellus** (Banks)
 Pubescence of head and thorax a little denser and the individual hairs apparently a little broader basally so that the pubescence has a slightly more silvery sheen; punctation of frons a little denser and finer; maxillary palpus usually light brown; some or all femora often fulvous. Not always distinguishable from *nigrellus* in the female, even with specimens for comparison, except in the cases of specimens with fulvous femora. SUBSPECIES OF CAERULESCENS 13

13. Front, middle, and hind femora blackish. 8a. **caerulescens subcorticalis** (Walsh)
 Front and middle femora fulvous, the hind femur fulvous or partly or entirely blackish 14

14. Face, frons, and some or all of clypeus blackish. 8b. **caerulescens caerulescens** (Dahlbom)
 Face, lower lateral corners of frons, and all of clypeus fulvous. 8c. **caerulescens floridanus** (Banks)

1. *Auplopus flavicoxae* (Banks)

Pseudagenia mexicana var. *flavicoxae* Banks, 1911, Proc. Ent. Soc. Wash., vol. 13, p. 238; Journ. New York Ent. Soc., vol. 19, p. 233, [♂, ♀]. Lectotype: ♂, Palmerlee, Ariz., June (Cambridge).

MALE: Forewing about 9 mm. long; clypeus truncate apically, its apical margin thin and simple; mandible evenly curved; second segment of flagellum about 4.7 as long as wide, the penultimate segment about 3.4 as long as wide; groove of pronotum with more distinct cross wrinkles than in the known males of the other Nearctic species of the genus; mesopleuron with small adjacent punctures, not shining, its pubsecence unusually long.

Head and body blackish with a weak iridescence of mixed green and blue; clypeus except medially, a broad mark next the eye from the clypeus tapering to a point halfway up the frons, most of mandible and a large median spot on seventh tergite, white; under side of antenna, palpi, tegula, and legs fulvous; middle and hind tarsi brownish apically; wings hyaline; abdomen with a fulvous tinge laterally and ventrally.

Female: Forewing about 11.0 mm. long; clothing hairs of frons dense, long and pale yellow, arising from subconfluent punctures on a mat background; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 7.3 as long as wide; groove of pronotum with short, fine, oblique wrinkles; punctures on mesopleuron very dense, somewhat confluent in rows (not confluent and a little less dense in the other Nearctic species); pygidial area polished, with a few scattered, weak punctures that are separated by about 4.0 their diameter.

Blackish with an unusually dense and long silvery pubescence. Apical margin of clypeus and inner orbits narrowly fulvous; mouth parts, flagellum, underside of scape, tegula, and legs fulvous, the flagellum basally brownish; apex of mandible dark ferruginous; apical segment of tarsi dark brown; wings hyaline.

Specimens: 2♂, 1♀ (lectotype ♂ and paratypes ♂♀), Palmerlee, Ariz., June (Cambridge).

2. *Auplopus inermis*, new species

Male: Unknown.

Female: Forewing 10.0 mm. long; clothing hairs of frons short, dense, and pale, arising from very fine adjacent punctures on a mat

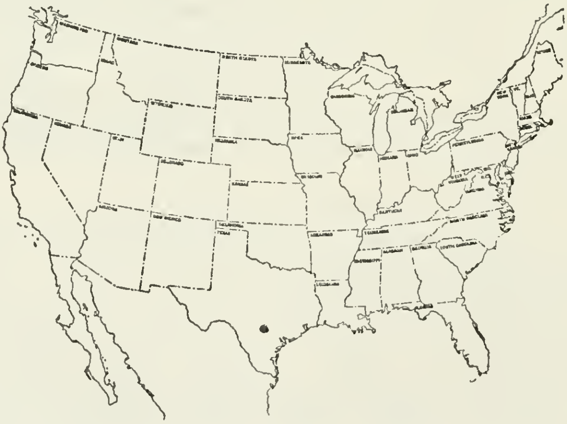


Figure 79.—Locality for *Auplopus inermis.*

background; apical margin of clypeus broadly arcuate, with a faint, broad, median lobe; second flagellar segment about 4.7 as long as wide; groove of pronotum with short cross wrinkles; pygidial area polished, with a few scattered weak punctures which are separated by about 4.0 their diameter.

Dull blackish, the frons with a very faint bluish iridescence. Palpi apically and underside of flagellum tinged with fulvous; mandible rufous apically; tegula mostly and legs beyond coxae fulvous; tarsi brown apically; wings with a faint brown tinge.

Type: ♀, Helotes Creek, Tex., Feb. 20, 1925, A. H. Wright (Ithaca).

3. *Auplopus variolarum*, new species

Male: Unknown.

Female: Forewing 8.0 mm. long; clothing hairs of frons short, dense, and pale, arising from very fine adjacent punctures on a mat background; apical margin of clypeus broadly arcuate, without a median production; second flagellar segment 5.0 as long as wide; groove of pronotum with short fine oblique wrinkles; pygidial area polished, with medium sized punctures that are separated by about 1.7 their diameter.

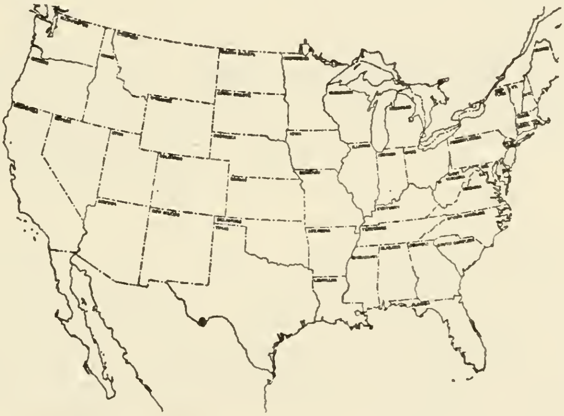


Figure 80.—Locality for *Auplopus variolarum.*

Black without any iridescence. Palpi brownish, paler apically; flagellum with a fulvous tinge apically beneath; apex of mandible ferruginous; tegula reddish brown; legs beyond trochanters rufous, the front tarsus somewhat infuscate, the middle tarsus brown, the hind tarsus blackish, tibial spurs dark brown, and the hind tibia infuscate apically above; wings hyaline.

Type: ♀, The Basin, Chisos Mts., 5,400 ft., Big Bend National Park, Tex., July 8 to 14, 1948, H. E. Evans (Washington, USNM 61797).

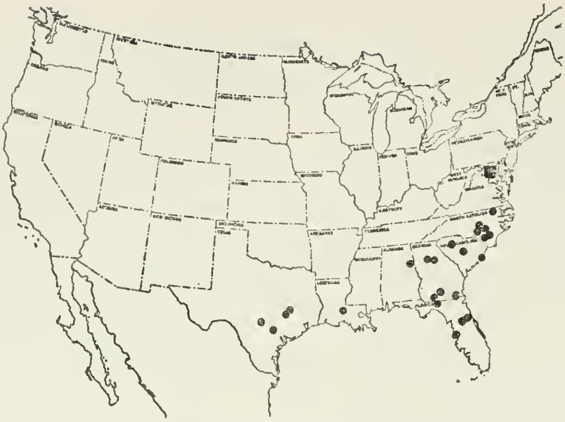


FIGURE 81.—Localities for *Auplopus adjunctus*.

4. *Auplopus adjunctus* (Banks)

Pseudagenia mellipes var. *adjuncta* Banks, 1911, Proc. Ent. Soc. Washington, vol. 13, p. 238; 1912, Journ. New York Ent. Soc. vol. 19, p. 233, [♀]. Lectotype: ♀, Fedor, Lee County, Tex., June 21, 1909, Birkmann (Cambridge).

Pseudagenia marionae Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 202. Type: ♂, Raleigh, N. C. (Raleigh).

MALE: Forewing 5 to 6.5 mm. long; clypeus truncate apically, its apical edge a little thickened medially; mandible evenly curved; second segment of flagellum about 3.3 as long as wide, the penultimate segment about 2.4 as long as wide; mesopleuron with dense fine subadjacent punctures, a little shining, its pubescence rather short.

Black. Face, lower lateral corner of frons, clypeus, mandible except apex and sometimes the base, hind margin and lower corner of pronotum, apical part of the fore coxa in front, and large spot on seventh tergite, white; apex of mandible ferruginous; palpi and under side of scape pale fulvous; flagellum somewhat tinged with fulvous below; legs, tegula, first abdominal segment, second abdominal segment except for a subapical tergal band, and much of third abdominal segment, rufous; wings subhyaline or faintly infuscate; middle and hind tarsi fuscous apically.

FEMALE: Forewing 7.5 to 9.0 mm. long; clothing hairs of frons short and orange, arising from distinctly separated punctures on a rather smooth but mat background; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 6.0 as long as wide; groove of pronotum with fine, weak, oblique wrinkles; pygidial area polished, without evident punctures.

Black, without iridescence. Apical part of mandible rufous; palpi pale brown, darker basally, underside of flagellum tinged with fulvous apically; tegula reddish brown; legs fulvous, the last tarsal segment brown; wings faintly to rather strongly infuscate.

The infuscation of the wings varies with the locality, being darkest in Florida and paler northward and westward. Most specimens from the Carolinian fauna are definitely paler winged than most of those from the Austroriparian. The infuscation of the wings of males varies somewhat in the same direction; but the wings are never more than faintly infuscate, so the locality differences are less conspicuous than in females.

Specimens (19♂, 63♀): From Alabama (Wadley); District of Columbia (Washington); Florida (Monticello, Orange County, Orlando, and Tarpon Springs); Georgia (Atlanta, Billys Island in the Okefenokee Swamp, Stone Mountain, Thomasville, and Tifton); Louisiana (Opelousas); Maryland (Cabin John, Glen Echo, and Takoma Park); North Carolina (Elizabethtown, Fayetteville, Johnston County, Murfreesboro, Raleigh, and Wallace); South Carolina (Columbia, Greenville, and McClellanville); and Texas (Brazos County, Fedor, Kerrville, and New Braunfels).

The collecting dates are scattered from midspring to early fall, unusually early and late dates of interest being Mar. 19 at Tarpon Springs, Fla.; Apr. 30 at Elizabethtown, N. C.; May 11 at Raleigh, N. C.; Sept. 4 at Greenville, S. C.; Oct. 13 at Murfreesboro, N. C.; and Nov. 9 in Brazos County, Tex. In my own collecting experience the species is often moderately common in the undergrowth of damp bottomland woods. A female in the Strandtmann collection was reared "11–9–35" from a mud cell found near the Brazos River, Texas.

This species occurs in the Gulf and Atlantic States from Texas to Maryland, the habitat being damp bottomland woods. Adults fly from midspring to early fall.

5. *Auplopus mellipes* (Say)

Male: Forewing 5.5 to 7.5 mm. long; apical margin of clypeus straight medially, angularly produced laterally, between the lateral corners much thickened (see from below); mandible with a strong bend at the middle; second segment of flagellum about 4.0 as long as wide, the penultimate segment about 2.8 as long as wide; mesopleuron with dense, fine, subadjacent punctures, a little shining, its pubescence rather short.

Black. Face and clypeus except often for a narrow median stripe, lower lateral corner of frons, underside of scape, mandible except at the base and apex, and a large median spot on seventh tergite, white; apex of mandible ferruginous; flagellum tinged with fulvous beneath; wings subhyaline; abdomen usually tinged with fulvous laterally; coloration of palpi, tegula, and legs varying according to the subspecies.

Female: Forewing 6.5 to 9.0 mm. long; clothing hairs of frons very short, pale, arising from fine subadjacent punctures on a mat or subpolished background; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 4.8 as long as wide; groove of pronotum with rudimentary fine, oblique wrinkles; pygidial area mat, apically with scattered punctures that are separated by about 2.5 their diameter.

Black, without iridescence. A very narrow line on inner orbit fulvous; flagellum fulvescent beneath; apical part of mandible ferruginous; palpi pale brown, darker basally; tegula brown; coloration of rest of legs varying with the subspecies; wings subhyaline.

There are three subspecies, differentiated on the basis of leg coloration, all in the eastern half of the United States and Canada.

5a. *Auplopus mellipes mellipes* (Say)

Pompilus mellipes Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 304 (Leconte edition, vol. 2, p. 746), ♀. Type: ♀, Indiana (destroyed).

Agenia fulvipes Dahlbom, 1843, Hymenoptera Europaea . . . , vol. 1, p. 92, ♀. Types: ♀ ♀, Pennsylvania and South Carolina (Lund).

Pseudagenia mellipes var. *interior* Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 233 [♀]. Type: ♀, Southern Pines, N. C. (Cambridge).

Biology: Rau, 1916, Journ. Animal Behavior, vol. 6, pp. 42–43, fig. 22; 1918, Wasp studies afield, pp. 84–89; 1926, Trans. Acad. Sci. St. Louis, vol. 25, pp. 196–197, and pp. 342–358, figs. 37–40; 1928, Ann. Ent. Soc. Amer., vol. 21, p. 26.—Krombein, 1952, Proc. Ent. Soc. Washington, vol. 54, pp. 176–177.

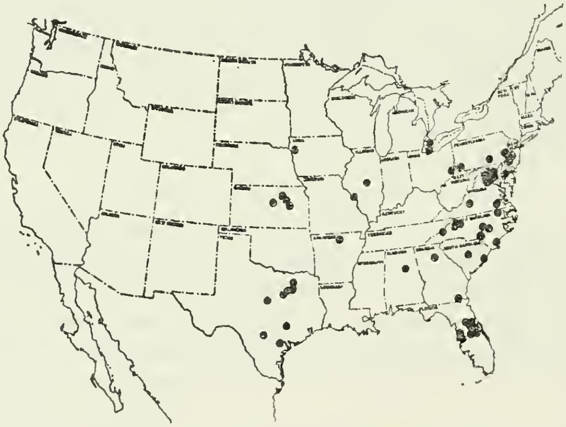


FIGURE 82.—Localities for *Auplopus mellipes mellipes*.

MALE: Palpi pale fulvous, fuscous basally; tegula and legs fulvous, the middle and hind tarsi usually mostly fuscous, the fore and middle coxae usually partly fuscous, and the hind coxa partly to mostly fuscous.

FEMALE: Legs beyond coxae fulvous, the tibial spurs and the tarsi apically brown. The dark stripe on the inner side of the hind tibia, which Banks described for his variety *interior*, is due to dirt in the tibial brush of his type.

Specimens (58♂, 149♀): From Alabama (Coosa River in Chilton County); Arkansas (Imboden); District of Columbia (Washington); Florida (Hillsboro County, Lake County, Orange County, Osceola County, Pasco County, Polk County, Seminole County, and Winter Park); Georgia (Atlanta and Billys Island in the Okefenokee Swamp); Illinois (Bloomington); Iowa (Sioux City); Kansas (Baldwin, Douglas County, Manhattan, and Onaga County); Maryland (Bowie, Cabin John, Cambridge, Glen Echo, Plummers Island, and Takoma Park); Missouri (St. Louis); New Jersey (Moorestown and Riverton); North Carolina (Crabtree Meadows at 3,600 ft. in Yancey County, Elizabeth City, Long Beach, Mount Mitchell, Raleigh, Southern Pines, and Statesville); Ohio (Bridgeport and Put in Bay); Ontario (Pelee Island); Pennsylvania (Marianna, Marsh Run in York County, Philadelphia, and Valley Forge); South Carolina (Columbia and McClellanville); Tennessee (Marshall); Texas (College Station, Commerce, Dallas, Eastland County, Hopkins County, Liberty Hill, Paris, and Victoria); and Virginia (Arlington, Chain Bridge, Dead Run in Fairfax County, Dunn Loring, Falls Church, Lake Drummond, Little Bald Knob in Augusta County, Mount Vernon, and Rosslyn).

The specimens at hand from Put in Bay, Ohio and Pelee Island, Ontario, and one from Carver County, Minn. are intermediate to the subspecies *variitarsatus*.

Dates of capture are rather evenly distributed from late spring to midfall, unusually early and late dates being Apr. 4 at Commerce, Tex.; Apr. 11 at Marianna, Pa.; Apr. 24 at Plummers Island, Md.; Apr. 30 at Raleigh, N. C.; May 2 at Atlanta, Ga.; Sept. 27 at Onaga, Kans.; Oct. 20 at Washington, D. C.; Nov. 13 in Pasco County, Fla.; and Dec. 23 in Orange County, Fla. This species is commonest in moist woods.

Rearing records are as follows: Two males on Apr. 4, 1939, from a mud nest taken at Commerce, Tex.; a male and two females on July 14, 1946, from a mud nest taken at Victoria, Tex.; two males and a female on May 21 and 25, 1917, from a nest in a vial taken at Plummers Island, Md., by H. L. Viereck; a male on Aug. 20, 1945, from an old *Trypoxylon politum* nest taken in Maryland by Morton Vogel; and some specimens in the U. S. National Museum from an abandoned *Polistes* comb collected by J. C. Bridwell. Rau records it using various holes and crevices, especially old nests of *Sceliphron caementarium,* which serve both as sources of building material and as crannies for its own mud cells. Females are very frequently found in houses, probably entering in search of nesting sites. Rau records *Phidippus* sp. and *Pisaurina undata* as prey, and *Chrysis pattoni* as a social parasite.

This subspecies occurs in the Carolinian and Austroriparian faunas, in woods. The dividing line between it and the subspecies *variitarsatus* seems to coincide with the farthest southward extent of glaciation. Adults are on the wing from late spring to midfall.

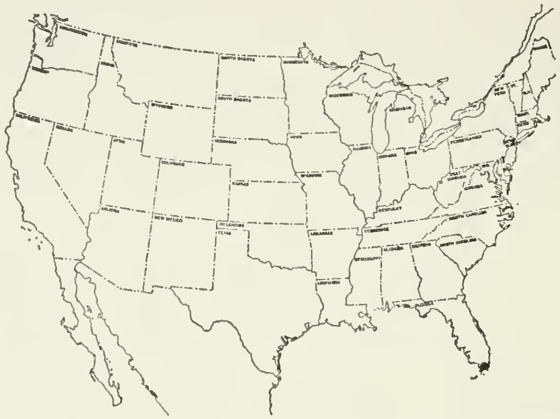


FIGURE 83.—Locality for *Auplopus mellipes meridianus.*

5b. *Auplopus mellipes meridianus,* new subspecies

MALE: Unknown.

FEMALE: Front coxa black, rufous at the extreme apex; middle and hind coxae rufous, infuscate basally; legs beyond coxae rufous, the tibial spurs and the tarsi apically brown.

TYPE: ♀, Paradise Key, Fla., Apr. 7, 1951, H. and M. Townes (Townes).

PARATYPES: 2♀, Paradise Key, Fla., Apr. 6, 1951, H. and M. Townes (Townes).

5c. *Auplopus mellipes variitarsatus* (Dalla Torre), new status

Pompilus (*Agenia*) *varipes* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 126, ♀ (preoccupied). Type: ♀, Illinois (Philadelphia).

Agenia variitarsata Dalla Torre, 1897, Catalogus hymenopterorum . . . , vol. 8, p. 210 (new name).

MALE: Palpi brownish to fulvous, infuscate at the base; tegula fulvous to dark brown; coxae blackish, the front coxa sometimes partly fulvous; front leg beyond coxa entirely fulvous or sometimes with fuscous areas; middle leg beyond coxa ranging from entirely fulvous with the tarsi brownish to almostly entirely blackish; hind leg blackish, often somewhat tinged with fulvous.

FEMALE: Legs black or blackish brown, with fulvous stains on the front of the fore tibia, much of fore tarsus, and at most of the joints.

Specimens intermediate to the typical subspecies are a female from Zumbra Heights, Carver County, Minn. (Townes); four males from

Put-in-Bay, Ohio (Cambridge) and a male from Point Pelee, Ontario (Cambridge). The intermediate specimen from Zumbra Heights, Minn., was collected with two typical females of the present subspecies.

Specimens (16♂, 75♀): From Connecticut (East Hartford and Killingly Pond); Illinois; Iowa (Sioux City); Maine (Lincoln County, Northeast Harbor, and Strong); Michigan (Allenville, Ann Arbor, Detroit, and Montmorency County); Minnesota (Hennepin County, Itasca Park, Lake Pepin, Olmstead County, and Zumbra Heights in Carver County); New Brunswick (Douglas Harbor on Grand Lake, and Fredericton); New Hampshire (Silver Lake at Chesham); New York (Allegany State Park, Cayuta Lake, East Aurora, Frontenac Point on Cayuga Lake, Ithaca, McLean Bogs in Tompkins County, North Hamlin, New Russia in Essex County, Onteroa Mt. in Greene County, Slaterville, and Wilson); Nova Scotia (Halifax, Kentville, and Round Hill); Ontario (Grimsby, Gull Lake in the Muskoka District, Jordan, Orillia, and Ottawa); Pennsylvania (Paupack and White Haven); Quebec (Aylmer); Vermont (Laurel Lake near Jacksonville); and Virginia (Falls Church).

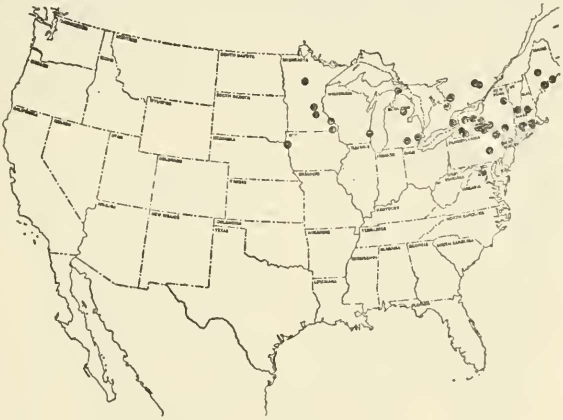


Figure 84.—Localities for *Auplopus mellipes variitarsatus.*

Collection records are from June 13 to Sept. 8, with three records earlier than June 13. Especially early and late records are Apr. 18 at Ann Arbor, Mich.; Apr. 27 at Grimsby, Ont.; June 3 in McLean Bogs, Tompkins County, N. Y.; June 13 at Itasca Park, Minn.; Sept. 3 at East Hartford, Conn.; Sept. 7 in Hennepin County, Minn.; and Sept. 8 at Ithaca, N. Y., and at Aylmer, Quebec. Biological notes associated with these specimens include four collections in woods, one on a log in woods, one on sand, one from honeydew under *Pinus strobus*, one on flowers of *Eupatorium perfoliatum*, three females "bred from mud cells under log" (no other data), and a female bred July 17, 1947, from a log of *Betula papyrifera* at Strong, Maine.

This species occurs in Canadian and Transition woods from the Atlantic west to Minnesota. The only record from south of Pennsylvania and Iowa is based on a female taken at Falls Church, Va., May 27, 1918, by R. A. Cushman (Washington). The flight range is from late in April to early in September.

6. *Auplopus mexicanus* (Cresson)

Pompilus (*Agenia*) *mexicanus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 130, ♀. Lectotype: ♀, Vera Cruz, México (Philadelphia).

Male: Forewing about 9 mm. long; clypeus short, its apical edge much thickened and with a deep semicircular impression or notch on each side of the middle; mandible with a strong bend at the middle; second segment of flagellum about 4.7 as long as wide, the penultimate segment about 3.4 as long as wide; mesopleuron with small adjacent punctures, not shining, its pubescence of moderate length.

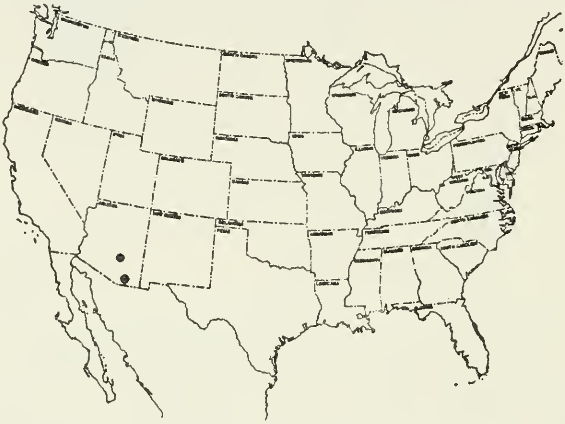


Figure 85.—Localities for *Auplopus mexicanus*.

Black. Head and thorax with a faint dark greenish iridescence. Lateral 0.35 and apical margin of clypeus, lateral 0.15 of face, and part of underside of scape whitish; part of underside of scape, underside of flagellum, tegula, apices of coxae, and legs beyond coxae fulvous, the middle and hind tarsi infuscate except basally; palpi brown; wings hyaline.

Female: Forewing 10.7 to 12.0 mm. long; clothing hairs of frons very short, pale, arising from fine adjacent punctures; apical margin of clypeus broadly arcuate with a weak median angulation; second flagellar segment about 6.4 as long as wide; groove of pronotum with rather coarse cross wrinkles; pygidial area mat, with a few very fine punctures apically.

Dull black, without iridescence. Apex of mandible ferruginous; palpi dark brown; tegula mostly brown; legs beyond coxae fulvous, the tibial spurs brown, and the tarsi apically dark brown; wings hyaline.

SPECIMENS: ♀, Huachuca Mts., Ariz., June 15, 1920, F. X. Williams (San Francisco). ♂, ♀, Parker Creek, Sierra Ancha, Ariz., Apr. 29 and May 5, 1947, H. and M. Townes (Townes). ♀ (type), Vera Cruz, México (Philadelphia).

7. *Auplopus mollis*, new species

MALE: Unknown.

FEMALE: Forewing 8.0 to 9.5 mm. long; clothing hairs of frons short, whitish, and dense, arising from fine adjacent punctures; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 4.5 as long as wide; groove of pronotum with weak cross wrinkles; pygidial area polished, without evident punctures.

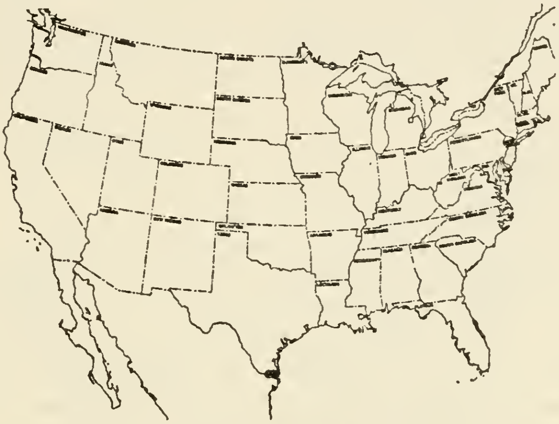


FIGURE 86.—Localities for *Auplopus mollis.*

Black, with a greenish blue iridescence that is strong on the head and thorax, weak on the coxae and abdomen. A narrow line on front orbit and part of apical edge of clypeus fulvous; apex of mandible rufous; palpi brown; tegula mostly pale brown; legs beyond coxae light rufous, the tibial spurs, middle and hind tarsi, and front tarsus beyond the first segment infuscate; wings hyaline.

TYPE: ♀, Mission, Tex., July 22, 1931, L. G. Plyler (Washington, USNM 61701).

PARATYPES: ♀, taken from grapefruit tree, San Benito, Tex., Aug. 15, 1931, W. R. Heard (Townes). ♀, taken from cabin of plane (from México), at Brownsville, Tex., Aug. 22, 1943 (Washington). ♀, taken from cabin of plane (from Guatemala) at Brownsville, Tex., Apr. 15, 1945 (Washington).

8. *Auplopus caerulescens* (Dahlbom)

MALE: Forewing 4 to 5 mm. long; apical margin of clypeus a little concave, the apex thin and simple; mandible evenly curved; second segment of flagellum about 3.2 as long as wide, the penultimate segment about 1.9 as long as wide; mesopleuron mat, with fine close punctures, its pubescence of moderate length, whitish and conspicuous; squama of genitalia unusually narrow and with an unusually strong median ventral protuberance.

FEMALE: Forewing 5.0 to 7.0 mm. long; clothing hairs of frons pale, faintly broader and more conspicuous than in *A. nigrellus* and *A. architectus*, arising from fine subadjacent punctures on a mat background; apical margin of clypeus broadly angled to a weak median point; second flagellar segment about 3.7 as long as wide; venation of forewing as noted in the key; groove of pronotum without distinct cross wrinkles; pygidial area polished, without evident punctures.

Coloration of both sexes blackish brown with a weak (male) or strong (female) greenish blue iridescence which is strongest on the thorax; head, antenna, mouth parts, legs, and abdomen with variable amounts of fulvous coloration, according to the subspecies; tegula light brown. Male with the apical half of mandible, clypeus except for a median spot, face except for a median spot, lower lateral corners of frons, and a large median spot on the last tergite, white. Female with the apical half of the mandible fulvous.

This is one of three Nearctic species with blackish legs and body with a bluish or greenish iridescence, the other two being *architectus* and *nigrellus*. Males are easily separated, but the females with difficulty. Some females of the present species have the legs partly fulvous and these are easily recognized as belonging here, since neither *architectus* nor *nigrellus* ever have the legs thus marked. Females of *caerulescens* without fulvous on the legs are difficult and often impossible to differentiate. (See the comparisons of the three species in the key to females.)

There are three subspecies as indicated below.

8a. *Auplopus caerulescens subcorticalis* (Walsh)

Agenia subcorticalis Walsh, 1869, Amer. Ent., vol. 1, p. 162, ♂, ♀. Types: ♂, ♀, ?Illinois (lost).

Pseudagenia antennalis Banks, 1910, Psyche, vol. 17, p. 251, ♀. Type: ♀, Fedor, Lee County, Tex., May 29, Birkmann (Cambridge).

Pseudagenia ariella Banks, 1941, Canadian Ent., vol. 73, p. 122, [♀] (new synonymy). Lectotype: ♀, Tempe, Ariz., Aug. 1, J. Bequaert (Cambridge).

Marked with fulvous stains on antenna, front femur, tibia, tarsus, and apex of coxa. The fulvous markings are often extensive, approaching those of the subspecies *caerulescens*. The arbitrary division between the two is whether the middle femur is mostly blackish (subspecies *subcorticalis*) or fulvous (subspecies *caerulescens*).

SPECIMENS (24♂, 44♀): From Arizona (Tempe and Tucson); British Columbia (Salmon Arm); California (Needles); Colorado

(Boulder); District of Columbia (Washington); Iowa (Iowa City and Sioux City); Kansas (Lawrence, Onaga, and Riley County); Maryland (Cabin John, Plummers Island, and Takoma Park); Minnesota (St. Anthony Park); New Jersey (Camden and Moorestown); North Carolina (Crabtree Meadows in Yancey County at 3,600 ft.); Ohio (Athens); Ontario (Ottawa); Pennsylvania (Arendtsville and Mount Holly Springs); Texas (Devils River, Fedor, McLennan County, Victoria, and Williamson County); Virginia (Arlington, Dixie Landing, and East Falls Church); and México (Guayamas).

Most collection dates are from late in May through August. Unusually early and late records of interest are: Apr. 1 to 6 at Needles, Calif.; Apr. 2 at Victoria, Tex.; Apr. 11 at Guayamas, México; May 5 at Devils River, Tex.; May 24 at Lawrence, Kans.; May 28 at Athens, Ohio; Oct. 5 at Onaga, Kans., Oct. 9 in Williamson County, Tex.; and Oct. 23, reared from a pomegranate from México.

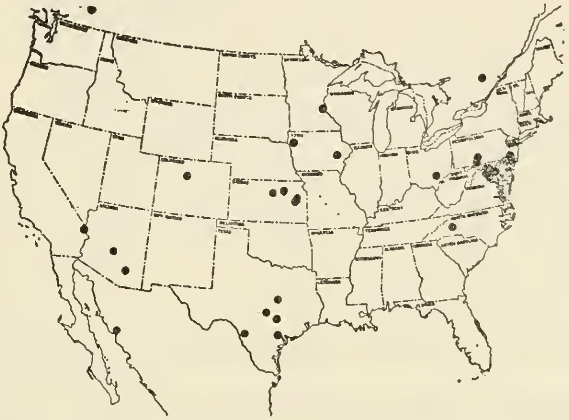


Figure 87.—Localities for *Auplopus caerulescens subcorticalis.*

Rearing records are as follows: ♀, reared Apr. 2, 1907, from cell found under bark, Victoria, Tex., J. D. Mitchell; 3♂, reared Oct. 23, 1931, from mud cells taken from pomegranate from México, J. D. Smith; ♂, ♀, emerged May 28, 1940, from material collected Feb. 10, 1940, at Athens, Ohio. The type material of *subcorticalis* was from mud cells found under bark and this form was originally differentiated from *A. architectus* partly by the fact that the cells were placed under bark rather than under stones.

The range of this subspecies covers most of the United States, southern Canada, and Northern México. It overlaps the range of the Southeastern subspecies *caerulescens*, but apparently not the range of the subspecies *floridanus* of Florida to South Carolina. Adults occur from late spring to early fall. The mud cells are placed under loose bark.

8b. *Auplopus caerulescens caerulescens* (Dahlbom)

Agenia caerulescens Dahlbom, 1843, Hymenoptera Europaea, vol. 1, p. 93, ♀. Type: ♀, South Carolina (Lund).

Pseudagenia coerulescens (!) Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 232. ♂, ♀ (misspelling).

Marked with fulvous as follows: Often the median spot on clypeus of male, often part of clypeus of female, front, middle, and often the hind femur, variable extents of the coxae, tibiae, and tarsi, and sometimes basolateral stains on abdomen. This subspecies integrades with both *subcorticalis* and *floridanus*, the arbitrary limits between it and the other two subspecies being indicated in the keys.

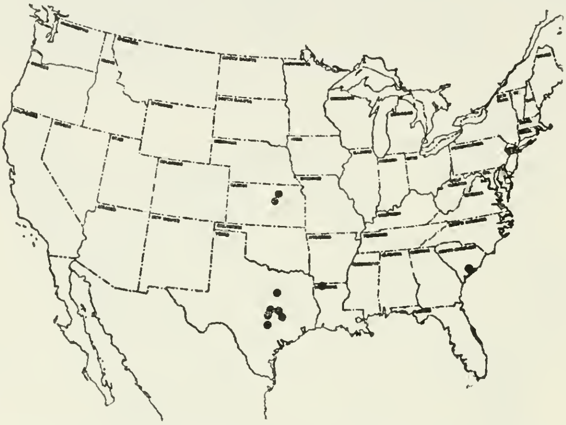


FIGURE 88.—Localities for *Auplopus caerulescens caerulescens.*

SPECIMENS: ♂, Manhattan, Kans., May 1948, Jas. B. Kring (Evans). ♂, Pottawatomie County, Kans., July 15, 1950, H. E. Evans (Evans). ♀, Homer, La., Nov. 8, 1907, F. C. Pratt (Washington). 2♂, Missouri (Washington). ♀, Fayetteville, N. C., early June 1921, C. S. Brimley (Raleigh). ♀, Fayetteville, N. C., May 4, 1939, D. L. Wray (Raleigh). ♀, Austin, Tex., Jan. 8, 1904, C. Hartmann (Washington). ♂, Brazos County, Tex., May 11, 1941, R. W. Strandtmann (Strandtmann). ♀, Dallas, Tex., Apr. 17, Cushman (Washington). ♀, McLennan County, Tex., Aug. 26, 1939, J. E. Gillaspy (College Station, Tex.). ♀, Mexia, Tex., Oct. 5, 1937, J. E. Gillaspy (College Station, Tex.) 5♂, Williamson County, Tex., Apr. 8 and 21, 1939, Apr. 21, 1934, Apr. 25, 1936, and Aug. 12, 1935, J. E. Gillaspy (College Station, Tex.). 3♀, Williamson County, Tex., Aug. 14, 1935, Oct. 5, 1938, and Oct. 21, 1933, J. E. Gillaspy (College Station, Tex.). 4♂, 6♀, Texas (Washington, Lawrence, and Townes).

This subspecies occurs from the Carolinas west to central Kansas and Texas.

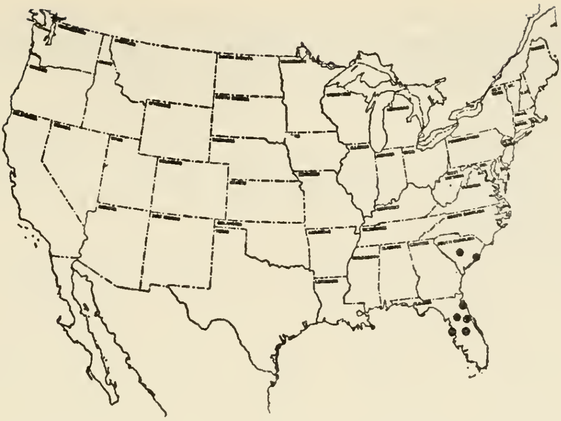


FIGURE 89.—Localities for *Auplopus caerulescens floridanus.*

8c. *Auplopus caerulescens floridanus* (Banks)

Pseudagenia floridana Banks, 1921, Ann. Ent. Soc. Amer., vol. 14, p. 21, ♀. Type: ♀, St. Augustine, Fla., Apr. 17 (Cambridge).

Marked with fulvous as follows: Most of antenna, median areas of male clypeus and frons, female clypeus, face, lower lateral parts of frons, mandible, coxae except more or less of their upper outer sides, more or less of trochanters, femora except often for stripes along upper side of middle and hind femur, more or less of tibiae below, stains on tarsi, and more or less of the abdomen laterally and ventrally. This subspecies intergrades somewhat with the subspecies *caerulescens*. The characters for the arbitrary division between these two are indicated in the keys.

SPECIMENS: ♂, Marion County, Fla., Apr. 9, 1930, H. I. Keck (Washington). 2♀, Osceola County, Fla., Aug. 7, 1929, J. J. Kirkland (Washington). ♀ (type), St. Augustine, Fla., Apr. 17 (Cambridge). ♀, Seminole County, Fla., June 24, 1929, J. E. Sadler (Washington). 2♀, Seminole County, Fla., July 29, 1929, H. Clark (Washington). ♂, ♀, Tarpon Springs, Fla., Mar. 19 and 21, 1950, H. Townes (Townes). ♂, Columbia, S. C., Aug. 18, 1951, G. F. Townes (Townes). 5♂, 2♀, McClellanville, S. C., May 10, 17, 18 and 19, 1944, H. and G. Townes (Townes).

This subspecies occurs in the Austroriparian fauna from Florida to South Carolina.

9. *Auplopus architectus* (Say)

MALE: Forewing 5.5 to 7.0 mm. long; apical margin of clypeus a little concave, the apex thin and a little reflexed; mandible evenly curved; second segment of flagellum about 3.2 as long as wide, the penultimate segment about 1.65 as long as wide; mesopleuron mat, with fine close punctures, its pubescence of moderate length, whitish; long erect setae on mesopleuron unusually numerous.

Black. Head and thorax with a strong greenish blue iridescence; legs and abdomen with a weak or faint dark bluish iridescence; stripe on lateral 0.12± of face, extending to lower part of frons, whitish; tegula, palpi, and sometimes front femur and tibia sometimes brownish; wings faintly infuscate.

Female: Forewing 6.0 to 9.0 mm. long; clothing hair of frons short, rather dark, arising from subadjacent punctures on a mat background; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 4.7 as long as wide; groove of pronotum without distinct cross wrinkles; venation as noted in the key; pygidial area polished, without evident punctures.

Black, with a bright greenish blue iridescence, strong on the head and thorax, weaker on the legs and abdomen. Wings hyaline to weakly infuscate, according to the subspecies.

This is one of three Nearctic species of *Auplopus* with black legs and body and a strong iridescence, the other two being *caerulescens* and *nigrellus*. The three are easily separated in the male, but with difficulty in the female (see the comparisons in the keys). There are two subspecies of *architectus*—*metallicus* of the Pacific States and British Columbia and *architectus* mostly east of the Rocky Mountains.

9a. *Auplopus architectus metallicus* (Banks)

Pseudagenia metallica Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 125, ♀. Type: ♀, Claremont, Calif. (Cambridge).

This subspecies differs in averaging a little smaller, with darker iridescence, fewer long erect hairs, and the wings somewhat more

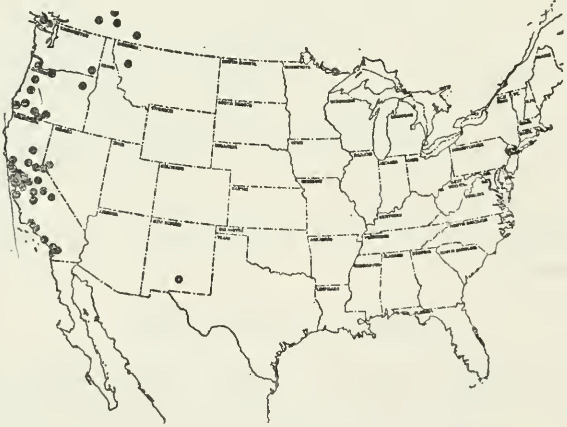


Figure 90.—Localities for *Auplopus architectus metallicus*.

infuscate, especially in the female. See the keys for a more exact comparison. Specimens from New Mexico, Arizona, and northern México tend to be intermediate between this and the typical subspecies.

Specimens (43♂, 133♀): From British Columbia (Kaslo, Midday Valley at Merritt, Salmon Arm, Steelhead, Vernon, and Victoria); California (Antioch, Berkeley, Brentwood, Carmel, Davis, El Dorado County, Fairfax, Forest Home in San Bernadino County, Lafayette in Contra Costa County, Leavitt Meadows in Mono County, Martinez, Menlo Park, Mill Valley, Mokelumne Hill, Morgan Hill, Murphys, Niles Canyon in Alameda County, Oakland, Patterson, Quincy, San Francisco, Santa Anna, Santa Clara, Saticoy, southern Sonoma County, Tomales Bay, Tracy, Ventura, Westley, and Weston in San Joaquin County); Montana (Lake Roman in Lake County); Nevada (Reno); New Mexico (Beulah and Cloudcroft); Oregon (Baker, Brookings, Colestin, Corvallis, Eugene, Grave Creek in Josephine County, Hillsboro, Hood River, Lake of the Woods, and Siskiyou Pass in Jackson County); and Washington (Pialschie and Wawawai).

Most dates of capture are from May to early in October. Unusually early and late dates are: Mar. 27 at Berkeley, Calif.; Apr. 23 at Corvallis, Oreg.; Apr. 24 at Berkeley, Calif.; Oct. 9 at Corvallis, Oreg.; Oct. 10 at Whittier, Calif.; Oct. 15 at Davis and Fairfax, Calif.; Oct. 16 at Carmel and Ventura, Calif.; and Oct. 27 at Antioch, Calif. Biological data associated with these specimens are: ♀ with prey (a salticid ♂), Lafayette, Contra Costa County, Calif., Sept. 9, 1948, E. G. Linsley; and ♀, bred from *Pseudotsuga taxifolia,* Pialschie, Wash., H. E. Burke.

This subspecies occurs west of the Rocky Mountains, intergrading with the subspecies *architectus* in Colorado, Arizona, New Mexico, and northern México.

9b. *Auplopus architectus architectus* (Say)

Plate 2, figure 30

Pompilus architectus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 302 (Leconte edition, vol. 2, p. 744), ♀. Type: ♀, Ohio (destroyed).

Biology: Walsh and Riley, 1869, Amer. Ent., vol. 1, pp. 132, 163.—Wickham, 1898, Ent. News, vol. 9, p. 47.

This subspecies differs in averaging a little larger, with paler iridescence, more long erect hairs, and the wings nearly hyaline. (See the keys for a more exact comparison.)

Say's description of *architectus* includes a description of the nests and the places these are found. These biological notes fit the present species very closely and show that the name should be applied here rather than to *nigrellus* or *caerulescens.*

Specimens (15♂, 146♀): From Alabama (Mobile and Montgomery); Arizona (Mount Lemmon, Oak Creek Canyon, Parker Creek in the Sierra Ancha, and on the road to Peterson Ranch in the Huachucha Mts.); Colorado (Poudre Canyon in Larimer County and Texas Creek); Connecticut (East Hartford); District of Columbia (Washington); Georgia (Cornelia); Kansas (Douglas County, Manhattan, and St. George); Maryland (Mayo Beach and Takoma Park); Massachusetts (Forest Hills); Minnesota (Rosebush Township in Cook County and Washington County); New Brunswick (Fredericton); New Mexico (Jemez Springs); New York (Farmingville, Ithaca, and Taughanic Falls); North Carolina (Hamrick, Perquimans, Mount Pisgah, Raleigh, and Swannanoa); Ohio; Ontario (Ottawa); Pennsylvania (Linglestown); Quebec (Knowlton); South Carolina (Greenville); Texas (Davis Mts., Eastland County, Hunt County, and Liberty Hill); Virginia (Arlington, Dunn Loring, and Skyline Drive); West Virginia (Bolivar); and México (Huanchinango in Puebla, Nombre de Dios in Durango, Sombrerete in Zacatecas, and Teotihuacán in "Pyr.").

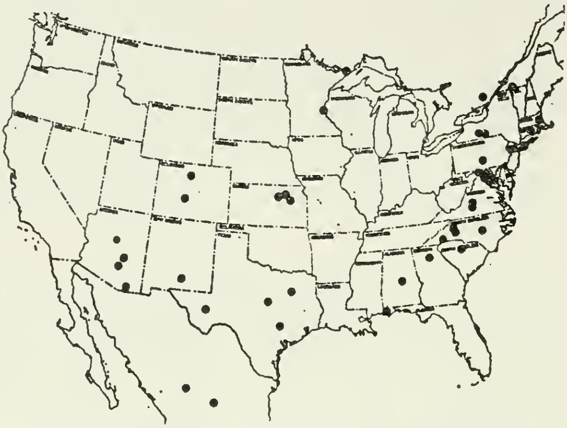


Figure 91.—Localities for *Auplopus architectus architectus.*

Specimens have been caught mostly from midspring well into the fall. The species seems particularly common during the first half of October. Early and late records of interest are: Feb. 22 in Eastland County, Tex.; Apr. 11 at Liberty Hill, Tex.; Apr. 2 at Greenville, S. C.; Apr. 25 at Parker Creek, Sierra Ancha, Ariz.; Apr. 27 at Cornelia, Ga., and Raleigh, N. C.; May 15 at Washington, D. C.; June 1 at Boston, Mass.; Oct. 9 at Mayo Beach, Md.; Oct. 21 at Raleigh, N. C.; Oct. 29 at Manhattan, Kans.; and Dec. 18 at Mobile, Ala. Biological notes with these specimens include one collection from nectaries of *Ricinus communis;* one collection at *Quercus* honeydew; one collection in woods; one collection "on forest floor"; one collection from sand along a stream; three different rearings from mud cells found under stones; two rearings from mud cells of unspecified origin; one with prey (*Misumenops oblongus* ♀, with legs cut off) taken by H. E. Evans at Manhattan, Kans.; and another with prey (*Phidippus audax* immature) taken by H. E. Evans at Ithaca, N. Y. In my own collecting experience this subspecies is common in pastures and abandoned fields, rather than in woods as is the case with *A. nigrellus*. Its mud cells are somewhat more rotund and more perfectly made of harder clay than with certain other species. Always they are under a stone in the open, in an irregular group of usually three to five, plastered to the stone and against one another, in a place the stone happened to be raised above the soil enough to give the female space.

This subspecies occurs in the Transition to Austroriparian Zones from the Atlantic to the Rocky Mountains and west of the Rocky Mountains into Colorado, New Mexico, and Arizona. It intergrades with the more western subspecies (*A. architectus metallicus*) in these three States and in northern México. Adults occur throughout the growing season, usually in overgrown fields. The nests are under stones in the open.

10. *Auplopus nigrellus* (Banks), new combination

Plate 1, figure 11

Pseudagenia nigrella Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 232, ♀. Lectotype: ♀, North Fork of Swannanoa River, Black Mt., N. C., May. (Cambridge).

Pseudagenia nanella Banks, 1912, Canadian Ent., vol. 44, p. 198, [♀]. Lectotype: ♀, Sea Cliff, Long Island, N. Y., Sept. 5 to 10 (Cambridge).

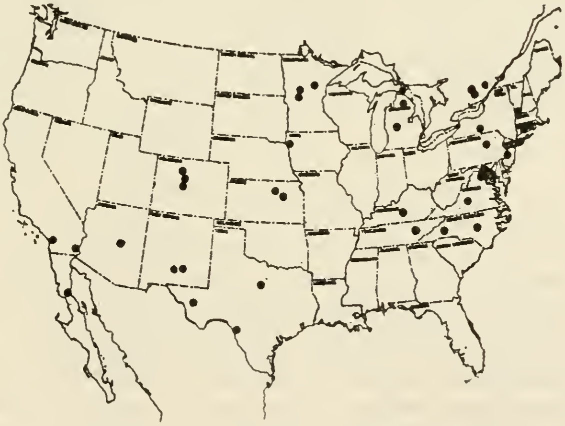


Figure 92.—Localities for *Auplopus nigrellus*.

Male: Forewing 4.7 to 6.0 mm. long; apical margin of clypeus a little concave, the apex thin and a little reflexed; mandible evenly curved; second segment of flagellum about 3.2 as long as wide, the penultimate segment about 1.65 as long as wide; mesopleuron mat, with fine punctures, its pubescence moderately short, whitish, or dusky.

Black. Head, thorax, and coxae with a dark greenish blue iridescence; legs beyond coxae and abdomen with a similar but fainter iridescence; lateral 0.3 ± of clypeus and lateral 0.25 ± of face whitish; palpi and tegula dark brown; wings subhyaline.

FEMALE: Forewing 4.5 to 6.8 mm. long; clothing hairs on frons short and rather dark, arising from fine distinctly separated punctures on a mat background; apical margin of clypeus broadly angled to a rounded median point; second flagellar segment about 3.8 as long as wide; pronotal groove without distinct cross wrinkles; venation as noted in the key; pygidial area polished, without evident punctures.

Black, with a dark greenish blue iridescence, rather strong on the head and thorax, rather weak on the legs and abdomen; wings subhyaline. The iridescence of this species is usually a little darker than in *architectus* or *caerulescens*.

Two other Nearctic species of *Auplopus* superficially similar to the present species are *caerulescens* and *architectus*. Males of the three are easily separated, but females with difficulty; females of *nigrellus* can usually be distinguished from those of *architectus*, but often not from those of *caerulescens* (see the comparisons in the keys).

SPECIMENS (113 ♂, 77♀): from Arizona (Oak Creek Canyon); California (Claremont and the Mojave Desert); Colorado (Colorado Springs, Denver, and near Estes Park); Connecticut (Chester and East Hartford); District of Columbia (Washington); Iowa (Sioux City); Kansas (Lawrence and Manhattan); Kentucky (Mammoth Cave); Maryland (Bowie, Cabin John, Glen Echo, Mayo, Plummers Island, and Takoma Park); Michigan (Mackinac Island, Mecosta County, and Montmorency County); Minnesota (Aitkin County, Alexandria, and Pope County); New Jersey (Riverton); New Mexico (Cloudcroft and Highrolls); New York (Ithaca and Sea Cliff); North Carolina (Hamrick and Raleigh); Oregon (Blooming); Pennsylvania (Dupont); Tennessee (La Follette); Texas (Del Rio, Eastland County, and Fort Davis); Vermont (Laurel Lake near Jacksonville); Virginia (Arlington, Dunn Loring, Great Falls, and Skyline Drive); and México (20 miles north of Comondú in Baja California).

Collecting dates are from late spring to early fall, or May 10 to Sept. 15 in most of its range. Some dates of capture outside of this span are: Mar. 20 at Washington, D. C.; Apr. 2 at Eastland, Tex.; Apr. 12 at Claremont, Calif.; May 9 at Lawrence, Kans., and in the Mojave Desert, Calif.; Sept. 22 at Cabin John, Md.; Sept. 24 at Manhattan, Kans.; and Oct. 26 and 31 at Takoma Park, Md. Biological data associated with the specimens are: one collection from pitch-pine honeydew; five collections in woods; two collections "on forest floor"; and a male reared May 9, 1911, from a mud cell found under a stone on golf links at Lawrence, Kans., by F. X. Williams. My own collecting experience indicates the typical habitat to be on or near the ground in rather open woods or along the edges of woods, usually in sunny spots.

This species appears to occur in most of the United States, southern Canada, and northern México. Definite records from many of the southeastern states, and from the Northwest, except for a single capture in Oregon, are lacking. Adults occur on or near the ground in open woods or along the edges of woods. They are on the wing from late spring to early fall.

Genus *Ageniella* Banks

Clypeus of moderate size, the apical margin truncate, somewhat concave, or convex, often with a median blunt point; mentum of female with a few long, slender, weakly curved hairs; front tibia without one of the apical bristles specialized; dorsal edge of hind tibia smooth in the male, smooth or serrate in the female; last tarsal segment with or without preapical bristles beneath; propodeum without, or sometimes with a few long erect hairs; first tergite without a line separating off the epipleuron; female without a pygidial area; subgenital plate of male rather narrow.

This genus is best developed in the Neotropics, with a considerable body of species occurring in the southern portion of the Nearctic Region. It seems not to occur in the Old World, unless the oriental *Meragenia* should be included as a subgenus. *Ageniella leucippe* Banks 1941, described from the Solomon Islands, is a species of *Auplopus* (new combination). The species have considerable structural diversity and may be separated into natural groups, the more distinct of which are treated here as subgenera.

Keys to the subgenera of Ageniella

MALES

1. Propodeum with long erect sparse hairs, in addition to the short pubescence; third cubital cell receiving the second recurrent vein near its basal 0.35. **Ameragenia** (p. 215)
   Propodeum without long erect hairs or with only a very few such hairs; third cubital cell receiving the second recurrent vein near or beyond its middle. . 2
2. Sixth sternite with a median apical rounded eminence; face and clypeus black, the face on each side with a narrow longitudinal white or yellowish mark (this mark sometimes obsolescent); spurs of fore and middle tibiae usually stramineus or dusky stramineus (exception: *A. reynoldsi*); spurs of hind tibia fuscous; forewing 4.5 to 8.5 mm. long . . . . . **Leucophrus** (p. 168)
   Sixth sternite without a median apical rounded eminence; face and clypeus usually black and without pale markings; tibial spurs variously colored; forewing 3.3 to 10.0 mm. long 3

3. Sixth sternite with a median longitudinal low polished ridge; pronotum elongate; brush on inner side of hind tibia with a subapical interruption; a species with black body and red abdomen . . . . **Nemagenia** (p. 174)
   Sixth sternite with a median, apical, weakly raised, rounded ridge, the sternite impressed on each side of the ridge; brush on inner side of hind tibia without a subapical interruption except in the *accepta* group of the subgenus *Ageniella;* coloration various 4
4. Hind, middle, and front tibial spurs white or whitish (in *A. arizonica* the spurs are extensively infuscate but the whitish color still evident). **Priophanes** (p. 176)
   Hind tibial spurs fuscous; middle and front tibial spurs either white or fuscous . . . . **Ageniella** (p. 189)

FEMALES

1. Propodeum with long sparse erect hairs in addition to the short pubescence; third cubital cell receiving the second recurrent vein near its basal 0.35; bristles on hind tibia long and stout, the tibia sometimes subserrate externally . . . . **Ameragenia** (p. 215)
   Propodeum without long sparse erect hairs or with only a few such hairs; third cubital cell receiving the second recurrent vein near or beyond its middle (pl. 2, figs. 31, 32, 33, 34); bristles on hind tibia weaker. 2
2. Outer edge of hind tibia smooth . . . . **Ageniella** (p. 189)
   Outer edge of hind tibia with one or two longitudinal rows of teeth. 3
3. Brush on inner side of hind tibia with a subapical interruption; pronotum somewhat elongate. . . . . **Nemagenia** (p. 174)
   Brush on inner side of hind tibia continuous to the apex. 4
4. Teeth on outer edge of hind tibia weak, the tibia longitudinally concave between the dorsal and the very weak subdorsal rows of teeth; lower edge of mandible in its basal third somewhat rounded and without a distinct ridge; apical hairless margin of clypeus narrow, mat to polished. **Leucophrus** (p. 168)
   Teeth on outer edge of hind tibia rather strong, the tibia not longitudinally concave between the two rows of teeth; lower edge of mandible in its basal third accentuated by a longitudinal ridge; apical hairless margin of clypeus moderately wide, largely or entirely mat. . . . . . . **Priophanes** (p 176)

Subgenus *Leucophrus* Townes

Leucophrus Townes, 1951, U. S. Dep. Agr., Agr. Monogr. No. 2, p. 917. Type: *Priocnemis semitincta* Banks; original designation.

Clypeus rather short, its hairless apical margin narrow, mat to polished, and not set off by a groove; lower edge of mandible in its basal third somewhat rounded and without a distinct ridge (with a more or less distinct ridge in all the other subgenera except *Nemagenia*); mesopleuron without an oblique carina at the front end of its transverse suture; propodeum with a few erect hairs of moderate length; brush on inner side of hind tibia continuous to the apex; hind tibia of female with a dorsal row of weak longitudinal teeth and a subdorsal row of subobsolete tuberclelike teeth, between the two rows the tibia longitudinally weakly grooved or concave; sixth sternite of male with a short apical longitudinal ridge terminating in a rounded eminence; subgenital plate of male with a median longitudinal ridge which fades out before the apex.

Male with the face black but with a more or less distinct longitudinal whitish or yellowish mark next the eye (not marked thus in the other subgenera); spurs of fore and middle tibiae of male usually whitish to dusky stramineous (blackish in *A. reynoldsi*); spurs of hind tibia of male blackish.

This subgenus includes larger species. It seems well distinguished from all the other subgenera, but is close to *Nemagenia*. Five species are included, four from the southern portion of the Nearctic region and an undetermined species from the State of Morelos in México (Evans and Berkeley).

Keys to the species of the subgenus Leucophrus

MALES

1. First three tergites ferruginous or largely so 2
   First three tergites black or blackish 3
2. Forewing slightly tinged with fuscous, the apex infuscate; veins of forewing dark brown . . . . 1. **semitincta** (Banks)
   Forewing tinged with yellowish, the apex infuscate; veins of forewing brownish stramineous, dark brown in the apical fuscous area . . 2. **reynoldsi** (Banks)
3. Upper part of head and of pronotum very densely punctate, the punctures so close that these parts are dull and the ridges between neighboring punctures on the frons are about 0.25 the diameter of the punctures . 3. **incita** (Banks)
   Upper part of head and of pronotum rather densely punctate, but the punctures separated enough that these parts are somewhat shining and the ridges between neighboring punctures on frons are about 0.35 the diameter of the punctures . . . . 4. **fulgifrons** (Cresson)

FEMALES

1. Abdomen ferruginous 2
   Abdomen black 3
2. Wings weakly infuscate, the apical part of the forewing darker; pubescence of head and thorax silver gray; third cubital cell receiving the second recurrent vein at its middle . . . . 1. **semitincta** (Banks)
   Wings yellow, the apical margin of the forewing fuscous; pubescence of head and thorax dark brown; third cubital cell receiving the second recurrent vein at its basal 0.4 . . . . 2. **reynoldsi** (Banks)
3. Clypeus, face, and frons with dense whitish pubescence that is not especially long; top of head, of pronotum, and of mesothorax with dense pubescence; wing veins fuscous . . . . 3. **incita** (Banks)
   Clypeus, face, and lower lateral portions of frons with dense, long, golden pubescence; top of head, of pronotum, and of mesothorax with rather sparse pubescence; wing veins yellowish brown . . . . . 4. **fulgifrons** (Cresson)

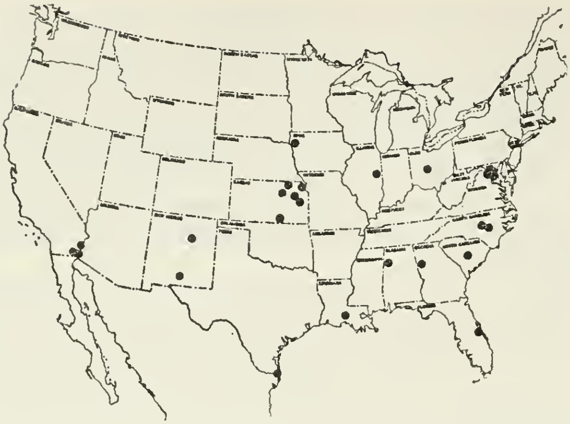


FIGURE 93.—Localities for *Ageniella semictincta.*

1. *Ageniella* (*Leucophrus*) *semitincta* (Banks)

Priocnemis semitincta Banks, 1912, Canadian Ent., vol. 44, p. 197, [♀]. Type: ♀, Las Vegas, N. Mex. (Cambridge).

Ageniella festina Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 109, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Ageniella fraternella Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 109, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Priophanes holonis Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 174, [♀]. Type: ♀, Urbana, Ill. (Cambridge).

MALE: Forewing 4.7 to 7.8 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum dense, but these parts shining a little.

Blackish. Face with a longitudinal cream-colored mark next the eye, this mark sometimes obsolescent; wings subhyaline, the apical part of the forewing weakly infuscate; wing veins dark brown; spurs of fore and middle tibiae stramineous or pale brown; first three abdominal segments rufous; seventh tergite with a large white spot; pubescence of head and thorax silver gray.

FEMALE: Forewing 5.7 to 8.5 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum dense; pubescence of face, clypeus, and lower lateral part of frons a little longer than elsewhere; second recurrent vein received at the middle of the third cubital cell.

Blackish. Wings tinged with brownish, the apical part of the forewing darker; wing veins fuscous; abdomen rufous; pubescence of head and thorax silver gray.

SPECIMENS (36 ♂, 59 ♀): From Alabama (Tuscaloosa); California (Blythe, Imperial County, and Westmorland); District of Columbia (Washington); Florida (Cocoa); Georgia (MacCollum in Coweta County and Sittons Gulch); Illinois (Urbana); Iowa (Sioux City);

Kansas (Baldwin, Cowley County, Doniphan County, Douglas County, Lawrence, Manhattan, and Marshall County); Louisiana (Opelousas); Maryland (Glen Echo); New Mexico (near Alamogordo and Las Vegas); North Carolina (Raleigh); Ohio (Columbus); South Carolina (Columbia); Texas (Brownsville); and Virginia (Falls Church).

The species seems generally distributed in the Carolinian, Austroriparian, and Lower Sonoran faunal areas. Adults occur mostly in June, July, and August. At Washington, D. C., they have been taken from June 9 to Aug. 18; at Raleigh, N. C., from May 23 to Sept. 8, and a female was taken at Blythe, Calif., on Oct. 3. There seems to be no difference in the flight season of the sexes. A female from Baldwin, Kans. and another from Raleigh, N. C., were taken while transporting immature specimens of *Agelenopsis* sp. Both sexes have been taken in numbers at the nectaries of *Cassia nictitans*, and at Raleigh, N. C., both sexes were found frequenting a sunlit bare red-clay bank, the females showing some interest in exploring the drying cracks. One of the females caught there had the top of the head and thorax plastered with dried red mud.

2. *Ageniella* (*Leucophrus*) *reynoldsi* (Banks)

Priocnemis reynoldsi Banks, 1933, Psyche, vol. 40, p. 12, ♀. Type: ♀, Fort Reynolds, Colo. (Cambridge).

MALE: Forewing 8.0 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum very dense, so that these parts are not at all shining.

Blackish. Face with an obsolescent longitudinal cream-colored mark next the eye; wings yellowish, the apex of the forewing infuscate; wing veins mostly brownish stramineous, but infuscate within the

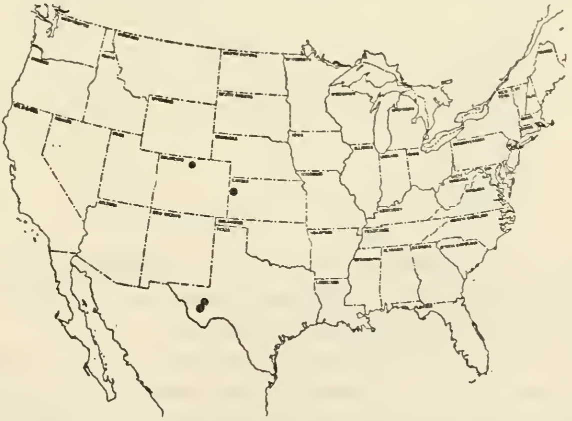


FIGURE 94.—Localities for *Ageniella reynoldsi*.

fuscous apex of the forewing; spurs of fore and middle tibiae blackish brown; first three abdominal segments ferruginous; seventh tergite with a large white spot; pubescence of head and thorax silver gray.

FEMALE: Forewing 8.5 to 10.5 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum very dense; pubescence of clypeus, face, and lower lateral part of frons a little longer than that elsewhere; third cubital cell receiving the second recurrent vein at its basal 0.4.

Black. Wings yellow, the apical margin of the forewing fuscous; wing veins yellowish brown; abdomen rufous; pubescence of head and thorax dark brown.

SPECIMENS: ♀ (type), Fort Reynolds, Colo., "Mills" (Cambridge). ♀, Wallace County, Kans., July 10 (Washington). ♂, 3 ♀, on *Sphaeralcea angustifolia*, 6 to 10 miles west of Fort Davis, Tex., at 5,000 ft., July 15 to 23, 1948, H. E. Evans (Evans). ♀, Marfa, Tex., July 15 to 23, 1948, H. E. Evans (Evans).

3. *Ageniella* (*Leucophrus*) *incita* (Banks)

Cryptocheilus incitus Banks, 1911, Journ. New York Ent. Soc., vol. 19, p. 234, ♀
Lectotype: ♀, Fedor, Lee County, Tex., July 2, 1909, Birkman (Cambridge)

MALE: Forewing 6.7 to 7.5 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum very dense, so that these parts are not at all shining. The punctures on the frons are quite close, with their intervening ridges usually about 0.25 as wide as the diameter of the punctures.

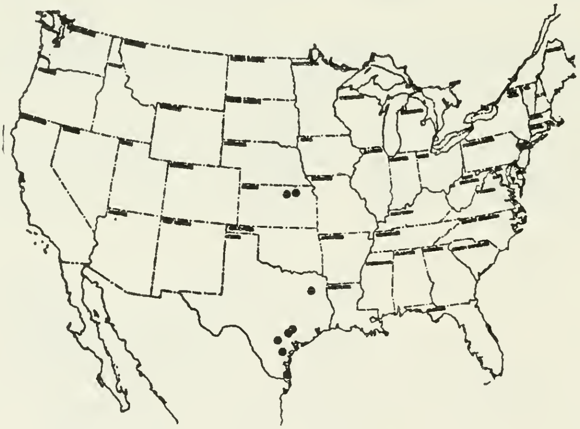


FIGURE 95.—Localities for *Ageniella incita*.

Blackish. Face with a longitudinal cream-colored mark next to the eye; wings weakly infuscate, the apical part of the forewing darker; wing veins blackish brown; spurs of fore and middle tibiae stramineous or pale brown; seventh tergite with a large white spot; pubescence of head and thorax silver gray.

Female: Forewing 9.5 to 10.5 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum very dense; pubescence of clypeus, face, and lower lateral part of frons a little longer than elsewhere; third cubital cell receiving the second recurrent vein at its basal 0.45.

Black. Wings weakly infuscate, the apex of the forewing infuscate; wing veins blackish brown; pubescence of head and thorax silver gray.

Specimens: ♀, Manhattan, Kans., June 26, 1950, Tom Harvey (Townes). ♀, Onaga, Kans., June 26, 1922, Crevecoeur (Manhattan). ♂, Brazos County, Tex., July 18, 1937, J. E. Gillaspy (College Station, Tex.). ♀, Brazos County, Tex., Oct. 1938, J. E. Gillaspy (College Station, Tex.). ♀, Fedor, Tex., October, Birkmann (Cambridge). ♀, Fedor, Tex. (Cambridge). ♀, Giddings, Lee County, Tex., July 6, 1946, H. E. Evans (Evans). 3♀, Port Isabel, Cameron County, Tex., June 20 to 23, 1948, H. E. Evans (Evans). ♀, Seagoville, Tex., Aug. 1944, Weyraud (Cambridge). ♂, Victoria, Tex., Apr. 26, 1904, W. E. Hinds (Washington). ♂, Victoria, Tex., Aug. 2, 1906, J. C. Crawford (Washington). ♀, Victoria, Tex., Sept. 25, 1912, J. D. Mitchell (Washington).

This species is known only from Texas and Kansas.

4. *Ageniella* (*Leucophrus*) *fulgifrons* (Cresson)

Pompilus (*Priocnemis*) *fulgifrons* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 114, ♀. Type: ♀, West Virginia (Philadelphia).

Pompilus (*Agenia*) *agilis* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 126, ♂. Lectotype: ♂, West Virginia (Philadelphia).

Salius fulgidifrons Dalla Torre, 1897, Catalogus hymenopterorum, vol. 8, p. 225 (emendation).

Male: Forewing 7.0 to 8.5 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum

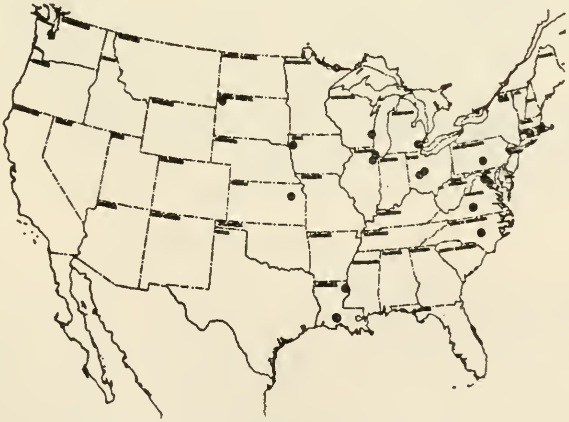


Figure 96.—Localities for *Ageniella fulgifrons*.

rather dense, but still sparse enough so that these parts are somewhat shining. The punctures on the frons are not quite contiguous, with their intervening ridges about 0.35 as wide as the diameter of the punctures.

Blackish. Face with a longitudinal whitish or cream-colored mark next to the eye, this mark sometimes obsolescent; wings tinged with brown, the apex of the forewing somewhat infuscate; wing veins dark brown; spurs of fore and middle tibiae stramineous; seventh tergite with a large white spot; pubescence of head and thorax silver gray.

Female: Forewing 7.5 to 9.0 mm. long; pubescence and setiferous punctures of mesoscutum and of upper part of head and pronotum sparse, so that these parts are quite shining; pubescence of clypeus, face, and lower lateral part of frons very long and dense; third cubital cell receiving the second recurrent vein at its basal 0.45.

Black. Wings tinged with yellowish brown, the apex of the forewing somewhat infuscate; wing veins yellowish brown; pubescence of head and thorax yellowish white, the long pubescence of the clypeus, face, and lower lateral part of the frons quite yellow.

Specimens: ♂, Lyme, Conn., July 12, 1918, W. S. Fisher (Washington). ♀, Chicago, Ill. (Cambridge). ♂, Wills County, Ill., Aug. 24, 1942, R. R. Dreisbach (Cambridge). 2♀, Sioux City, Iowa, 1922 and no date, C. N. Ainslie (Washington). ♀, Iowa, Aug. 7, 1937, H. E. Jaques (Ithaca). ♂, Lawrence, Kans., June 10, 1900 (Evans). 2♂, Opelousas, La., May and June 15, 1897, G. R. Pilate (Washington). ♂, Tallulah, La., June 25, 1948, R. C. Gaines (Washington). ♀, Detroit, Mich., July 17, 1937 (Shappirio). ♀, Raleigh, N. C., Aug. 3, 1934, C. S. Brimley (Raleigh). ♂, Columbus, Ohio, July 15, 1930, J. S. Hine (Cambridge). ♀, Logan County, Ohio, July 12, 1930, J. Patton (St. Paul). ♀, Linglestown, Pa., Aug. 2, 1911, W. S. Fisher (Washington). ♀, Tiverton, R. I. (Cambridge). ♂, Camp Crook, S. Dak., Aug. 1, 1924 (Cambridge). 2♀, Dunn Loring (near Vienna), Va., July 27, 1947, and Aug. 6, 1949, K. V. Krombein (Krombein). 5♂, 5♀, at honeydew, Falls Church, Va., July 5, 11, and 25, Aug. 22, and Sept. 6, N. Banks (Cambridge). ♀, East Troy, Wis., Aug. 10, 1935, Paul B. Lawson (Lawrence).

This species is on the wing mostly in July and August. It occurs in the Carolinian and Austroriparian faunal areas.

Subgenus *Nemagenia* Banks

Nemagenia Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 179. Type: *Pompilus* (*Agenia*) *longulus* Cresson; original designation.

Clypeus rather short, its apical hairless margin rather narrow, polished, and not set off by a groove; lower edge of mandible in its basal third somewhat rounded and without a distinct ridge (with a more or less distinct ridge in all the other subgenera except *Leucophrus*);

pronotum rather elongate, especially in the male (not elongate in any of the other subgenera); mesopleuron without an oblique carina at the front end of its transverse suture; propodeum posteriorly with a few inconspicuous suberect hairs; brush on inner side of hind tibia with a wide subapical interruption; hind tibia of female with two external rows of teeth, the dorsal row longer and comprised of stronger teeth than the subdorsal row, the tibia not longitudinally concave between the two rows; sixth sternite of male with the apical margin weakly concave, the surface of the sternite with a median longitudinal low polished ridge which is highest apically; subgenital plate rounded to an apical point with a median longitudinal polished ridge and sloping away to each side, the apical edge of the plate with a fringe of short stout setae.

Face and tibial spurs of both sexes blackish.

Only one species is known, the Nearctic and Neotropic *longula.*

5. *Ageniella* (*Nemagenia*) *longula* (Cresson)

Pompilus (*Agenia*) *longulus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 129, ♂. Type: ♂, Dakota (Philadelphia).

Agenia longa Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 205, "♀" = ♂. Type: ♂, Texas (Philadelphia).

Priocnemis directa Banks, 1912, Canadian Ent., vol. 44, p. 197, [♀]. Lectotype: ♀, Lee County, Tex., August, Birkmann (Cambridge).

Priophanes otiosa Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 442, ♀. Type: ♀, Santa Cruz, Bolivia (Cambridge).

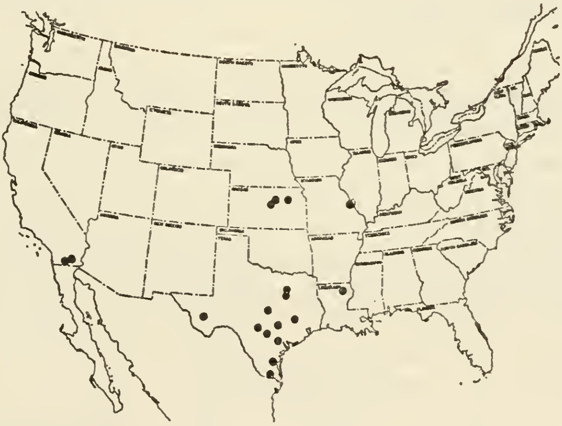


FIGURE 97.—Localities for *Ageniella longula.*

MALE: Forewing 4.5 to 6.3 mm. long. Blackish. Wings subhyaline, the apical part of the forewing brownish; abdomen rufous, sometimes infuscate beyond the fourth segment.

FEMALE: Forewing 5.5 to 10.5 mm. long. Blackish. Wings rather uniformly light brown; abdomen rufous.

Specimens (28♂, 45♀): From California (Calexico and Imperial County); "Dakota"; Kansas (Dickinson County, Douglas County, and Manhattan); Louisiana (Tallulah); Missouri (St. Louis); Texas (Brazoria County, College Station, Dallas, Fort Davis, Lee County, Maxwell, McLennan County, Plano, Rio Grande River in Hidalgo County, Riviera Beach in Kleburg County, Victoria, Waco, and Williamson County).

The type of *Priophanes otiosa* is from Santa Cruz, Bolivia, and in the Cambridge Collection are two females from Blairmont, British Guiana, collected in Nov. 1928 by F. X. Williams; these indicate a wide distribution in the Neotropics. Dates of the collections are mostly from the middle of June to the middle of September. Early and late dates are: Apr. 30 in Brazos County, Texas; April and May in Imperial County, Calif.; May 30 in Lee County, Tex.; June 2 at Maxwell, Tex.; Sept. 10 and Oct. 10 in Riley County, Kans.; and Oct. 7 in Williamson County, Tex. There seems to be little difference in the flight period of the sexes.

This species occurs in the warmer portions of the Central States, in southern California, and south to British Guiana and Bolivia. It has not yet been taken east of Louisiana or Missouri. Adults occur through the warmer part of the season.

Subgenus *Priophanes* Banks

Priophanes Banks, 1944, Psyche, vol. 50, p. 82. Type: *Priocnemis facetus* Cresson; original designation.

Clypeus with its hairless apical margin rather wide, partially or entirely mat, and separated from the rest of the clypeus by a weak groove; mesopleuron without an oblique carina at the front end of its transverse suture; propodeum posteriorly with a few inconspicuous erect hairs; brush on innner side of hind tibia continuous to the apex; hind tibia of female with two external rows of teeth, a dorsal row of chevron-shaped teeth and a subdorsal row of subtuberculate teeth, the tibia not longitudinally concave between the two rows; sixth sternite of male with a median, apical, weakly raised, rounded ridge, the sternite impressed on each side of the ridge; subgenital plate of male short spatulate, with a median longitudinal raised area which tapers from a base of appreciable width to a narrow apex reaching or surpassing the midpoint of the plate.

All tibial spurs of male white, whitish, or stramineous, more or less fuscous at the base.

This subgenus includes the eight Nearctic species treated below and the Neotropic *Priocnemis dowi* Banks 1938 (=*Priocnemis arioles* Banks 1944, new synonymy), *Priocnemis parkeri* Banks 1925, *Prio-*

phanes comes Banks 1946, *Priophanes pictipennis* Banks 1946, and *Priophanes rufigaster* Banks 1946. The Neotropic species have not previously been referred to *Ageniella* and the first two listed have not previously been placed in *Priophanes. Ameragenia adele* Banks 1946 probably belongs here, but the type lacks the abdomen and hind tibiae and so is difficult to classify. Bradley (1944, Notulae Naturae, No. 145, p. 6) places *Pompilus* (*Priocnemis*) *sartorianus* Cresson 1867 in *Priophanes.* I have studied the type of *sartorianus* and though it is a member of the Macromerini with teeth on the outside of the hind tibia, it disagrees in several characters with *Priophanes* as defined here.

Keys to the Nearctic species of the subgenus Priophanes

MALES

(Males of *fuscipennis, rufescens, arizonica arizonica* and *placita sonorensis* are unknown.)

1. Clypeus with its apical 0.25 to 0.5 white or stramineous. 1b. **arizonica concolor,** new subspecies
Clypeus entirely black or partly rufous 2
2. Femora rufous or largely so 3
Femora blackish 6
3. Head and thorax rufous to blackish; forewing with a faint brownish cloud over the basal vein and another subapically (in the second and third cubital and the second discoidal cells); nervulus beyond the basal vein by about 1.0 the width of the vein; frons more sparsely punctate. SUBSPECIES OF FACETA 4
Head and thorax blackish; forewing without a brownish cloud over the basal vein or subapically; nervulus beyond the basal vein by about 0.7 the width of the vein; frons more densely punctate. SUBSPECIES OF PLACITA . . 5
4. Habitat Gulf and South Atlantic States except Florida. 3a. **faceta faceta** (Cresson)
Habitat Florida and México . . . . . 3b. **faceta ventralis,** new subspecies
5. Habitat east of the 100th meridian . . . . . . 4a. **placita placita** (Banks)
Habitat west of the 100th meridan . 4b. **placita sonorensis,** new subspecies
6. First three tergites black or blackish . . . . 5. **agenioides** (Fox)
First three tergites rufous or largely so . . . . 6. **arcuata** (Banks)

FEMALES

1. Head and thorax mostly or entirely rufous. 2
Head and thorax black or blackish 6
2. Forewing without a fuscous band over the basal vein; punctures on frons separated by about 1.0 their diameter, those on central part of mesoscutum separated by about 0.5 their diameter. 3
Forewing with a fuscous band over the basal vein (pl. 2, fig. 31); punctures on frons and on central part of mesoscutum separated by about 2.5 their diameter. SUBSPECIES OF FACETA 5

3. Apical margin of clypeus very weakly convex; sides of pronotum with fine but rather strong punctures; forewing with a very faint postmedian infuscate area; trochanters not infuscate above; teeth on dorsal edge of hind tibia a little stronger. . . . . 2. **rufescens** (Banks)
   Apical margin of clypeus with an obtuse median angle that projects like a weak, blunt tooth; sides of pronotum with fine, very weak punctures; forewing with a definite postmedian infuscate area, in addition to the apical infuscation; trochanters infuscate above; teeth on outer edge of hind tibia very weak. SUBSPECIES OF ARIZONICA 4
4. Abdomen mostly blackish . . . . 1a. **arizonica arizonica** (Banks)
   Abdomen rufous . . . . 1b. **arizonica concolor**, new subspecies
5. Second and following abdominal tergites mostly or entirely rufous. 3a. **faceta faceta** (Cresson)
   Second and following abdominal tergites entirely blackish, or blackish margined with fulvous . . . . 3b. **faceta ventralis**, new subspecies
6. Tibiae and at least the hind femur rufous; nervulus beyond basal vein by 0.25 to 0.4 the length of the nervulus; body pubescence very dense, giving a hoary appearance. SUBSPECIES OF PLACITA 7
   Tibiae and femora blackish; nervulus beyond basal vein by 0.5 to 0.7 the length of the nervulus; body pubescence not unusually dense. 8
7. Basal part of femora and usually the trochanters rufous. 4a. **placita placita** (Banks)
   Basal part of femora and the trochanters infuscate. 4b. **placita sonorensis**, new subspecies
8. Range: California; wings moderately infuscate; teeth on dorasl edge of hind tibia unusually strong and erect. . . . . . . 7. **fuscipennis**, new species
   Range: east of the Rocky Mountains; wings weakly infuscate; teeth on dorsal edge of hind tibia not usually strong and erect 9
9. Abdomen black . . . . 5. **agenioides** (Fox)
   Abdomen rufous . . . . 6. **arcuata** (Banks)

1. *Ageniella* (*Priophanes*) *arizonica* (Banks)

MALE: Forewing 3.2 to 5.0 mm. long; nervulus beyond the basal vein by about 0.3 its length. (For coloration of the male, see under the subspecies *concolor*.)

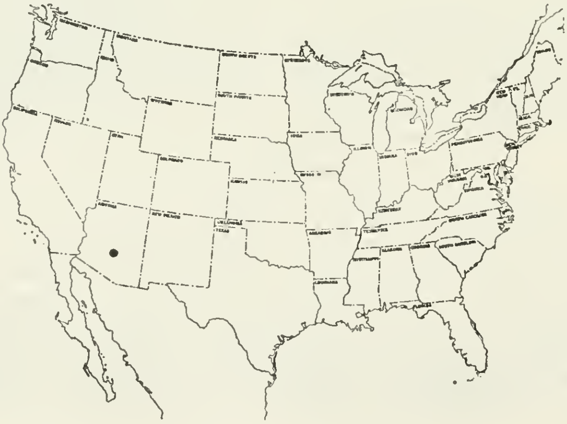


FIGURE 98.—Locality for *Ageniella arizonica arizonica*.

Female: Forewing 4.2 to 6.0 mm. long; pubescence of head and thorax moderately dense, the setiferous punctures a little weaker than usual for the subgenus; apical hairless margin of clypeus mat, slightly widened medially, its apical edge with a weak median rounded angulation; nervulus beyond the basal vein by about 0.7 its length; teeth on outer edge of hind tibia rather weak.

Fulvo-ferruginous. Trochanters above somewhat infuscate; apex of hind tibia and joints of hind tarsus infuscate; wings subhyaline, the forewing with apical margin narrowly infuscate and with an infuscate cloud centering over the juncture of the second intercubital and the cubital veins, the hind wing with its apex faintly infuscate. Abdomen either fulvous (subspecies *concolor*) or blackish (subspecies *arizonica*).

There are two subspecies, differing in the color of the abdomen, at least in the female.

1a. *Ageniella* (*Priophanes*) *arizonica arizonica* (Banks)

Priocnemis arizonica Banks, 1933, Psyche, vol. 40, p. 14, ♀. Lectotype: ♀, Tempe, Ariz., Aug. 2, J. Bequaert (Cambridge).

Male: Unknown.

Female: Abdomen blackish, the first tergite ferruginous anteriorly.

Specimens: Redescribed from the type (♀, Tempe, Ariz., Aug. 2, J. Bequaert) and another female with the same data. Both specimens are at Cambridge.

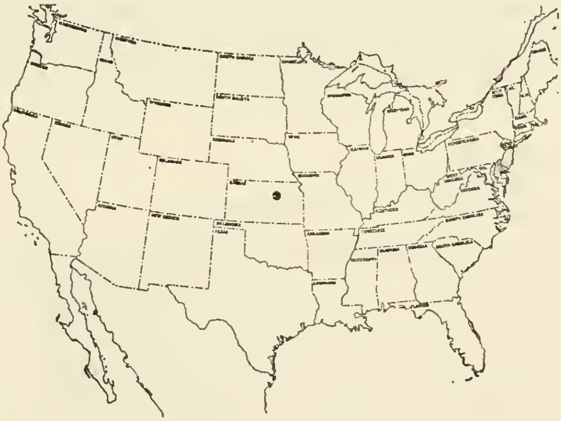


Figure 99.—Locality for *Ageniella arizonica concolor.*

1b. *Ageniella* (*Priophanes*) *arizonica concolor*, new subspecies

Male: Black. Apical 0.3 to 0.6 of clypeus and sometimes a longitudinal mark next the eye on each side of face whitish; most of mandible light brown; palpi and under side of scape stramineous; tegula and hind margin of lateral lobes of pronotum brown; trochanters sometimes partly brown; femora and tibiae varying from fuscous to bright ferruginous, the tibiae of the middle and hind legs darker at the base and apex; tibial spurs stramineus, infuscate basally; wings hyaline the apex of the hind wing and the apical part of the forewing (beyond the tip of the radial cell) somewhat infuscate; a small faint infuscate cloud centering over the juncture of the second intercubital and the cubital veins; first three tergites ferruginous, the base of the first fuscous and the third sometimes more or less infuscate; fourth and following tergites tinged with ferruginous; seventh tergite with a large whitish spot.

Female: Abdomen entirely fulvous.

Type: ♀, visiting cottonwood honeydew, Manhattan, Kans., July 8, 1950, H. E. Evans (Washington, USNM 61798).

Paratypes: ♂, on corn and sorghum infested with mealybug, Manhattan, Kans., July 5, 1934, R. H. Painter (Manhattan). 2♂, 2♀, same data as the type (Townes). 3♂, Manhattan, Kans., July 16, 1950, H. E. Evans (Evans). ♂ ♀, Manhattan, Kans., July 27, 1950, H. E. Evans (Evans).

2. *Ageniella* (*Priophanes*) *rufescens* (Banks), new combination

Priocnemis rufescens Banks, 1939, Canadian Ent., vol. 71, p. 229, [♀]. Type: ♀, Aden, N. Mex. (Cambridge).

Male: Unknown.

Female: Forewing about 4.7 mm. long; pubescence of head and thorax moderately dense, the setiferous punctures strong; apical hairless margin of clypeus mat, not widened medially, its apical margin very weakly convex; nervulus beyond the basal vein by about 0.5 its length.

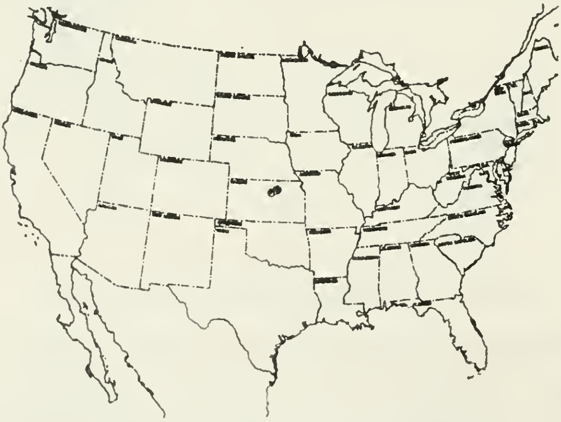


Figure 100.—Localities for *Ageniella rufescens*.

Ferruginous. Wings hyaline, their apices a little darkened; extreme base of first tergite blackish.

Specimens: ♀, Dickinson County, Kans., August, J. C. Bridwell (Washington). ♀, Riley County, Kans., Sept. 3, J. B. Norton (Manhattan). ♀ (type), Aden, N. Mex., July 12, 1917 (Cambridge). ♀, July 29, 1916 (Townes).

3. *Ageniella* (*Priophanes*) *faceta* (Cresson)

Male: Forewing 4.0 to 4.5 mm. long; nervulus beyond the basal vein by about 1.0 its width; wings hyaline, the forewing with an abrupt apical infuscation, a weak discal fuscous cloud and a weak fuscous fascia along the basal vein and nervulus; the hind wing with a weak apical infuscation; all tibial spurs white; seventh tergite with a large whitish spot. The coloration is described further under the two subspecies.

Female: Forewing 4.5 to 5.5 mm. long; pubescence of head and thorax sparse, these parts quite shiny; apical hairless margin of clypeus mat, slightly widened medially, its apical edge with a weak median rounded angulation; mesoscutum subpolished, with fine rather sparse punctures; nervulus beyond the basal vein by about 0.5 its length.

Fulvo-ferruginous. Axillae and base of first abdominal segment black; wings subhyaline, the hind wing with a weak apical infuscation and the forewing with three transverse brownish fasciae—a narrow fascia along the apical margin, a broad discal fascia, and a narrow fascia along the basal vein and nervulus (pl. 2, fig. 31). The color of the abdomen varies from entirely fulvo-ferruginous to mostly blackish, as described under the subspecies.

3a. *Ageniella* (*Priophanes*) *faceta faceta* (Cresson)

Plate 2, figure 31

Priocnemis facetus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 205, ♀. Type: ♀, Texas (Philadelphia).

Cryptocheilus pallescens Banks, 1910, Journ. N. Y. Ent. Soc., vol. 18, p. 121, [♀]. Type: ♀, Falls Church, Va. (Cambridge).

Male: Color varying from fulvo-ferruginous with the tarsi and antennae somewhat infuscate to blackish with the following parts fulvo-ferruginous: clypeus largely, mouth parts largely, scape largely, coxae except above, trochanters except for weak infuscation above, femora except for a strong fuscous stripe on the hind side of the hind femur and a weak one on the hind side of the middle femur, fore tibia, first two abdominal segments, and all but the apical part of third abdominal segment. Fore tarsus, middle tibia and tarsus, and hind tibia more or less infuscate and tinged with fulvous. Tibial spurs white. The males with the most extensive fulvo-ferruginous coloration (head, thorax, and legs entirely of this color) are from the Lower Austral Zone of North Carolina and further material may show them representative of a distinct race. Females collected with them seem typical of this subspecies.

FEMALE: Abdomen entirely fulvo-ferruginous or somewhat darkened apically.

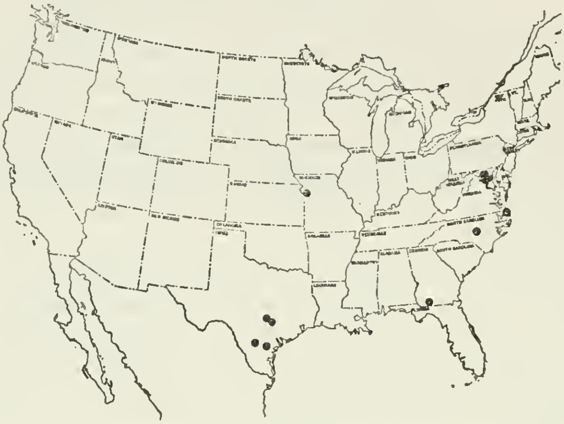


FIGURE 101.—Localities for *Ageniella faceta faceta.*

SPECIMENS: ♀, Washington, D. C., June 18, 1946, M. Vogel (Vogel)· ♂, Washington, D. C., Sept. 5, 1946, M. Vogel (Vogel). ♀, Washington, D. C., Sept. 16, 1945, D. Shappirio (Shappirio). ♀, Washington, D. C., Sept. 16, 1944, M. Vogel (Vogel). ♀, Washington, D. C., Sept. 28, 1945 (Vogel). ♀, Thomasville, Ga., May 30, 1915, C. S. Spooner (Ithaca). 5♀, Takoma Park, Md., Sept. 5 and 11, 1943, H. and M. Townes (Townes). 5♂, Kill Devil Hills, N. C., June 5, 1948, June 27, and July 1, 10, and 16, 1950, K. V. Krombein (Krombein). 3♀, Kill Devil Hills, N. C., June 30, and July 5 and 14, 1950, K. V. Krombein (Krombein). ♂, Wake County, N. C., July 28, 1951, G. F. Townes (Townes). 3♀, Raleigh, N. C., June 2, and Oct. 3 and 15, 1951, H. and M. Townes (Townes). ♂, Wake County, N. C., July 28, 1951, G. F. Townes (Townes). 2♀, Fedor, Tex., May 29, 1901, and June 24, 1898, Birkmann (Cambridge). ♀, Giddings, Lee County, Tex., July 6, 1946, H. E. Evans (Evans). ♀, Gillett, Karnes County, Tex., June 25, 1917 (Ithaca). 4♀, on Guadalupe River at Victoria, Tex., June 16, 1948, H. E. Evans (Evans). ♀, Lee County, Tex., Oct. 1910 (Cambridge). ♀, San Gabriel River, Tex., June 28, 1936, J. E. Gillaspy (College Station, Tex.). ♀, Falls Church, Va., Sept. 4, 1915, C. T. Greene (Washington). ♀, Falls Church, Va., Sept. 14, 1915, G. M. Greene (Washington). 3♂, 6♀, taken mostly at tulip tree honeydew, Falls Church, Va., July 5 and 25, Aug. 22, and Sept. 3, 8, and 16, N. Banks (Cambridge).

This is a subspecies of the Gulf and South Atlantic States, except Florida, where it is replaced by the subspecies *ventralis*. Seasonal data suggest an early summer and a late summer brood. The females from Takoma Park, Md., were taken in a damp meadow of grass and *Solidago*, at honeydew; those from Raleigh in September and October were taken at the nectaries of *Cassia nictitans*. All these looked and acted like large red ants crawling over the vegetation, and were rather slow to take flight, trusting more to their legs.

3b. *Ageniella (Priophanes) faceta ventralis*, new subspecies

MALE: Fulvo-ferruginous. Tibial spurs white, the middle and hind ones ferruginous basally; wings subhyaline, with a cloud over the basal vein, a broader cloud just beyond the stigma, and its apex infuscate; first abdominal segment and basal part of second abdominal segment fulvous, the rest of the abdomen blackish with a fulvous tinge at the apex.

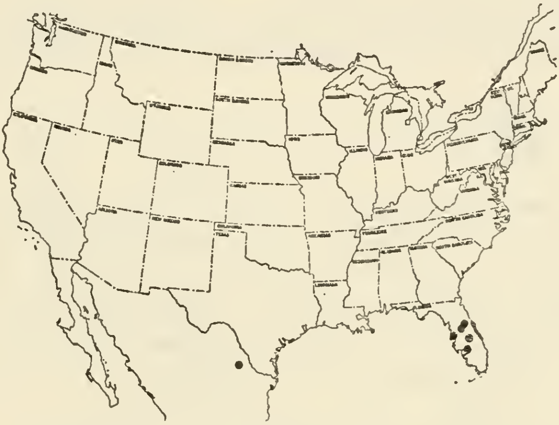


FIGURE 102.—Localities for *Ageniella faceta ventralis*.

FEMALE: First abdominal segment fulvous, the rest blackish with the sclerites more or less distinctly margined with fulvous; fuscous markings on wings a little darker and more extensive than in the subspecies *faceta*. In the paratype from México the basal third of the second abdominal segment is fulvescent.

TYPE: ♀, Orlando, Fla., June 19, 1931 (Washington, USNM 61702).

PARATYPES: ♂, Arcadia, Fla., Mar. 31, 1954, K. V. Krombein (Krombein). 2♀, Larkins, Fla., April and May (Cambridge). ♀, Osceola County, Fla., Aug. 6, 1929, J. J. Kirkland (Washington). ♀, Pasco County, Fla., Sept. 10, 1929, J. W. Chapman (Washington). ♀, Seminole County, Fla., Aug. 16, 1929, C. Nelson (Washington). ♀, Vallecillo, Nuevo Léon, México, June 2 to 5, 1951, H. E. Evans (Evans).

4. *Ageniella (Priophanes) placita* (Banks)

MALE: Forewing about 4.2 mm. long; punctation of frons and mesoscutum a little denser than in the male of *faceta*; nervulus beyond the basal vein by about 0.6 to 1.2 its width. (For coloration, see under the subspecies *placita placita*.)

FEMALE: Forewing 4.3 to 5.3 mm. long; pubescence of head and thorax very dense, giving a hoary appearance; apical hairless margin of clypeus entirely mat, slightly widened medially, the central half of its apical edge evenly convex; mesoscutum mat, with very dense fine punctures; nervulus beyond the basal vein by about 0.33 its length.

Black, but of hoary appearance from the dense silver-gray pubescence. Apical half of clypeus, mouth parts mostly, more or less of antenna beneath and basally, tibiae, and at least the hind femur, fulvous; tarsi light brown; wings subhyaline, the apex of the forewing weakly infuscate; abdomen rufous.

This species is represented by two subspecies, distinguishable on the coloration of the coxae, trochanters, and femora of the female.

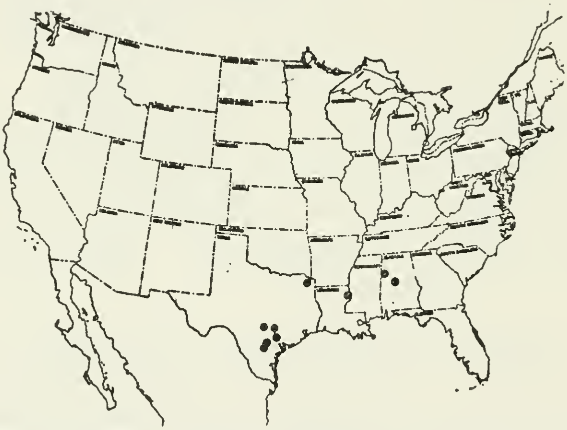


FIGURE 103.—Localities for *Ageniella placita placita*.

4a. *Ageniella (Priophanes) placita placita* (Banks)

Cryptocheilus placitus Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 122, ♀. Type: ♀, Fedor, Lee County, Tex. (Cambridge).

Pseudagenia apicipennis Banks, 1910, Journ. New York Ent. Soc., vol. 18. p. 123, ♂. Type: ♂ (abdomen lacking), Fedor, Lee County, Tex. (Cambridge).

MALE: Blackish, the scape, legs, and basal half of abdomen fulvo-ferruginous; mouth parts dusky fulvous; clypeus except basally and underside of pedicel and flagellum stained with fulvous; apex of forewing somewhat infuscate; fore and hind coxae sometimes darkened above; tibial spurs white; tarsi brown; seventh tergite with a large whitish spot.

Female: Femora, trochanters, and coxae entirely fulvous, or the coxae more or less infuscate and the trochanters sometimes weakly infuscate.

Specimens: ♀, Burkville, Ala., June 10, 1917 (Ithaca). ♀, Tuscaloosa, Ala., May 22, 1948, R. L. Chermock (Evans). 3♀, Tallulah, La., June 25, July 1, and Aug. 8, 1948, R. C. Gaines (Washington). ♀, Austin, Tex. (Cambridge). ♂, Brazos County, Tex., July 24, 1937, J. E. Gillaspy (Townes). ♂ (type of *apicipennis*), Lee County, Tex., Aug. 1906, Birkmann (Cambridge). ♀ (type of *placitus*), Lee County, Tex., June 29, 1906, Birkmann (Cambridge). ♀, McLennan County, Tex., Aug. 17, 1939, J. E. Gillaspy (College Station, Tex.) ♀, New Boston, Tex., Aug. 30, 1905, F. C. Bishopp (Washington). ♂, Williamson County, Tex., June 17, 1934, J. E. Gillaspy (College Station, Tex.). ♀, Texas (Washington).

The range is from Alabama to Texas. The flight season is from late in May to late in August.

4b. *Ageniella (Priophanes) placita sonorensis*, new subspecies

Male: Unknown.

Female: Coxae and trochanters infuscate; front and middle femora infuscate, more or less fulvous apically; hind femur fulvous, infuscate basally.

Type: ♀, Lindsay, Calif., June 23, 1909, collected on *Asclepias* by W. A. Davidson (Washington, USNM 61703).

Paratypes: ♀, Claremont, Calif., C. F. Baker (Cambridge). ♀, Imperial County, Calif., May 1911, J. C. Bridwell (Washington). 5♀, Lemon Cove, Tulare County, 500 ft., July 9 to 11, 1907, J. C. Bradley (Ithaca and Cambridge). ♀, Los Angeles County, Calif.,

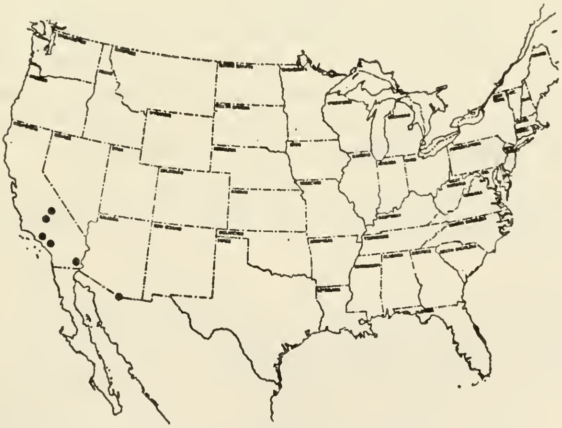


Figure 104.—Localities for *Ageniella placita sonorenisis.*

D. W. Coquillett (Washington). ♀, Nogales, México, Mar. 29, 1946 (Washington).

The range is restricted to the Lower Sonoran faunal area.

5. *Ageniella (Priophanes) agenioides* (Fox)

Priocnemis agenioides Fox, 1893, Journ. New York Ent. Soc., vol. 1, p. 54, ♀. Type: ♀, southern Illinois (Philadelphia).

Pseudagenia virginica Banks, 1910, Psyche, vol. 17, p. 251, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Ageniella subra Brimley, 1934, Ent. News, vol. 45, p. 42, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

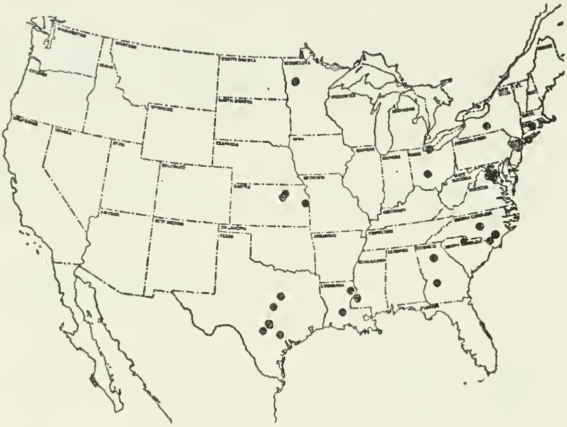


Figure 105.—Localities for *Ageniella agenioides.*

Male: Forewing 4.0 to 4.5 mm. long. Black. Wings hyaline, the apex of the forewing weakly infuscate; all tibial spurs white; seventh tergite with a large whitish spot.

Female: Forewing 4.5 to 6.0 mm. long; pubescence of head and thorax moderately dense; apical hairless margin of clypeus mat, slightly widened medially, the central half of its apical edge evenly convex; mesoscutum with rather close fine punctures and weakly mat; nervulus beyond the basal vein by 0.7 its length.

Black. Frons, mesoscutum, and abdomen with a faint bluish iridescence; wings subhyaline, the apex of the forewing weakly infuscate.

Specimens (20♂, 49♀): From Connecticut (East Hartford); District of Columbia (Washington); Georgia (Atlanta and Unadilla); Illinois (southern Illinois); Kansas (Baldwin, Manhattan, and Pottawatomie County); Louisiana (Opelousas and Tallulah); Maryland (Cabin John, Cabin John Bridge, Great Falls, and Glen Echo); Minnesota (Norman County); Mississippi (Natchez); New Jersey (Milburn); New York (Farmingville and Ithaca); North Carolina (Raleigh, Wallace, and Whiteville); Ohio (Put-in-Bay); Pennsylvania

(Rockville); South Carolina (Spartanburg); Texas (Meridian Creek in Bosque County, New Braunfels, Rassor, Victor, and Williamson County); and Virginia (Dunn Loring, Falls Church, and Pohick Run).

Early and late collection dates are: May 27 at Natchez, Miss.; May 29 at Victoria, Tex., and at Washington, D. C.; May 30 at Whiteville, N. C.; Sept. 6 at East Hartford, Conn.; Sept. 23 at Falls Church, Va., and at Raleigh, N. C.; and Oct. 3 at Manhattan, Kans. A female from Riley County, Kans., was taken by H. E. Evans with prey, a very immature salticid with five of its legs cut off.

The species ranges over the eastern half of the United States, being common in the south. Adults are on the wing from early summer to early fall.

6. *Ageniella* (*Priophanes*) *arcuata* (Banks)

Cryptocheilus arcuatus Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 120, ♀. Lectotype: ♀, Fedor, Lee County, Tex., May 24, 1906, Birkmann (Cambridge).

Pseudagenia birkmanni Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 124, ♂. Type: ♂, Fedor, Lee County, Tex. (Cambridge).

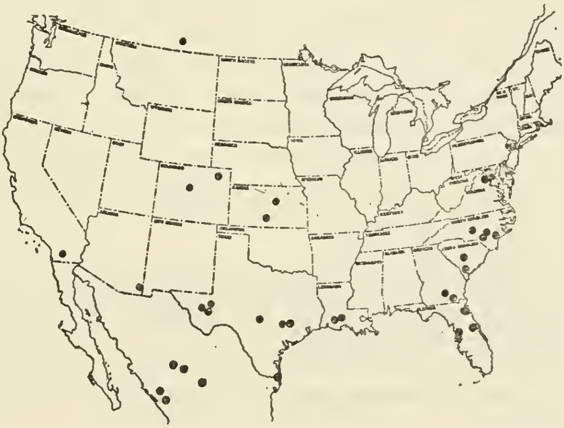


Figure 106.—Localities for *Ageniella arcuata.*

Male: Forewing 3.5 to 7.5 mm. long. Black. Wings hyaline, the apex of the forewing weakly infuscate; all tibial spurs whitish; first two abdominal segments and much of the third rufous; seventh tergite with a large white spot.

Female: Forewing 5.0 to 5.8 mm. long; pubescence of head and thorax moderately dense; apical hairless margin of clypeus mat basally and polished apically, faintly widened medially, the central half of its apical edge almost evenly convex; mesoscutum mat and with dense fine punctures; nervulus beyond the basal vein by about 0.6 its length.

Black. Frons and mesoscutum with a faint bluish iridescence; wings subhyaline, the apex of the forewing weakly infuscate; abdomen rufous.

Specimens (32♂, 76♀): From Alberta (Medicine Hat); Arizona (Douglas); Colorado (Boulder and Logan County); District of Columbia (Washington); Florida (Hernando County, Jacksonville, Orange County, and Pasco County); Georgia (Nashville and Tifton); Kansas (Manhattan, Reno County, and Riley County); Louisiana (Crowley and Opelousas); North Carolina (Clinton, Wake County, Wallace, and Wendell); South Carolina (Columbia and Yemassee); Texas (Balmorhea Lake in Reeves County, Brazos County, Brownsville, College Station, Davis Mts. in Jeff Davis County, Fedor, Fort Davis, and Williamson County); Virginia (Clifton); and México (Ahuacatlán and Chapalilla in Nayarit, Canutillo and Nombre de Dios in Durango, Sombrerete in Zacatecas, Teotihuacán, Vera Cruz (city), and Villa Guadalupe in Jalisco).

Collection dates for males are mostly in early to midsummer, though there are July and August records, and one for Sept. 14 at Nashville, Ga. Females come on the wing somewhat later and are much more numerous than males after July. Extreme dates for males are: May 6 at Opelousas, La.; May 24 at Clinton, N. C.; June 4 at Columbia, S. C.; July 13 at Raleigh, N. C.; July 21 in Williamson County, Tex.; August in Riley County, Kans.; and Sept. 14 at Nashville, Ga. Extreme dates for females are May 6 at Opelousas, La.; June 7 at Raleigh, N. C., and at Washington, D. C.; Sept. 30 at Yemassee, S. C.; Oct. 1 at Manhattan, Kans.; Nov. 13 in Pasco County and Hernando County, Fla. These data indicate more than one brood per season.

This species occurs in the Transitional, Upper Austral, and Lower Austral Zones east of the Rocky Mountains. Adults are on the wing throughout the warm season.

7. *Ageniella* (*Priophanes*) *fuscipennis*, new species

Male: Unknown.

Female: Forewing 5.5 to 6.5 mm. long; pubescence of head and thorax rather dense; apical hairless margin of clypeus mat, not widened medially, the central half of its apical edge evenly convex; mesoscutum mat, with very close fine punctures; nervulus beyond the basal vein by about 0.75 its length; teeth on outer side of hind tibia more erect and tuberclelike than in other members of the subgenus.

Black. Wings infuscate, a little paler basally, and the apex of the forewing a little darker; abdomen varying from dark red to black. The abdomen of the type is dark red.

Type: ♀, Tracy, San Joaquin County, Calif., May 31, 1949, J. W. MacSwain (Berkeley).

Paratypes: ♀, Oakley, Contra Costa County, Calif., Aug. 9, 1936, E. C. Van Dyke (San Francisco). 2 ♀, same data as the type (Berkeley and Townes). ♀, Tracy, Calif., May 20, 1949, R. F. Smith (Townes). ♀, Tracy, Calif., June 3, 1949, J. W. MacSwain (Berkeley). ♀, Tracy, Calif., June 7, 1949, J. W. MacSwain (Townes). ♀, Tracy, Calif., Aug. 1, 1949, P. D. Hurd (Berkeley).

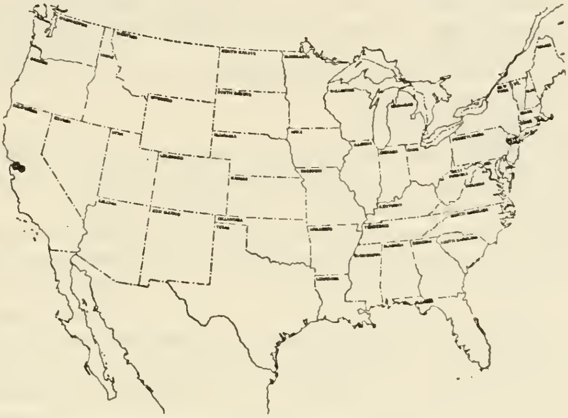


Figure 107.—Localities for *Ageniella fuscipennis.*

This species has been taken only in California. Though superficially similar to *A. arcuata* or *A. agenioides*, according to whether the abdomen is red or black, respectively, it is distinct from both in several minor characters and has a different range.

Subgenus *Ageniella* Banks

Ageniella Banks, 1912, Journ. New York Ent. Soc., vol. 19, p. 222. Type: *Pompilus* (*Agenia*) *acceptus* Cresson; original designation.

Hairless apical margin of clypeus usually polished and nearly always set off from the rest of the clypeus by a groove; mesopleuron with or without an oblique carina at the front end of its transverse groove; propodeum usually without any erect hairs, only with pubescence; brush on inner side of hind tibia with or without a subapical interruption; upper side of hind tibia without teeth; sixth sternite of male with a median apical, weakly raised, rounded ridge, on each side of which the sternite is impressed; subgenital plate of male usually tectate.

Fore and middle tibial spurs whitish or blackish; hind tibial spurs blackish, or if the insect's body is rufous the tibial spurs may all be ferruginous.

This subgenus is well developed in the southern half of North America and in the West Indies. A few species reach southern Canada. Several are known from Panamá, but only one (the Chilean *argenteosignatus*) from farther south. The known species may be divided into four species groups as noted in the keys and as described at the beginning of each of the groups.

Keys to the Nearctic species of the subgenus Ageniella

MALES

(Males of *grisea*, *pallida*, *evansi*, and *submetallica* are unknown; the first two should run to couplet 2, and the last two to couplet 8.)

1. Tibial spurs of the front and middle legs whitish, those of the hind legs blackish. PARTITA GROUP 2
   Tibial spurs of all legs blackish 4
2. Middle and hind femora and first three tergites rufous or largely so; longest spur of hind tibia about 0.6 as long as its basitarsus . . 1. **partita** Banks
   Middle and hind femora and first three tergites blackish 3
3. Exposed portion of subgenital plate about 1.3 as long as wide; longer spur of hind tibia about 0.65 as wide as the hind basitarsus; seventh tergite light brown; apical hairless margin of clypeus rather wide.
   4. **seminole**, new species
   Exposed portion of subgenital plate about 2.0 as long as wide; longer spur of hind tibia about 0.7 as wide as the hind basitarsus; seventh tergite brown with a large white spot; apical hairless margin of clypeus not wider than usual . . . . 5. **mintaka** Brimley
4. Brush on inner side of hind tibia with a subapical interruption; frons nearly always with an obscure ferruginous spot next to the upper part of eye. ACCEPTA GROUP 5
   Brush on inner side of hind tibia continuous to the apex though usually narrowed subapically; frons without a ferruginous spot next to the upper part of the eye. 7
5. Hind femur rufous. . . . . 17. **accepta** (Cresson)
   Hind femur blackish 6
6. Flagellum beneath blackish brown, its bristles large enough to be conspicuous among the fine erect sense hairs. . . . . 15. **conflicta** Banks
   Flagellum beneath fulvous or strongly tinged with fulvous, its bristles rather short and weak, not conspicuous among the fine erect sense hairs.
   16. **blaisdelli** (Fox)
7. Body, head, and legs ferruginous; wings dark brown; external longitudinal basal carina on fore coxa strongly curved and ending at about its basal 0.3; last tarsal segment with bristles beneath. CORONATA GROUP.
   14. **coronata** Banks
   Body, head, and legs blackish; wings subhyaline, the forewing infuscate apically, or sometimes entirely blackish; external longitudinal basal carina on fore coxa weakly curved and ending near or beyond the midlength of the coxa; last tarsal segment without bristles beneath. CUPIDA GROUP. . . 8
8. Subgenital plate with erect hairs that are at least as long as the width of the plate. 9
   Subgenital plate without erect hairs 10
9. Erect hairs on subgenital plate scattered over its surface, straight with their apical 0.25 bent. . . . . 12. **norata** Banks
   Erect hairs on subgenital plate in a row around its edge, evenly and strongly curved inward, plus a median row or band of shorter ascending hairs.
   13. **neglecta** Banks

10. Clypeus with a small blunt median apical tooth, or sometimes the tooth absent; apical hairless margin of clypeus very narrow and indistinct or subobsolete; mesopleuron without a trace of an oblique carina extending downward from the front end of its transverse suture. SUBSPECIES OF OBSCURA 11
    Clypeus without a median apical tooth; apical hairless margin of clypeus distinct, of appreciable width and set off from the rest of the clypeus by a small groove; mesopleuron often with a short oblique carina extending downward from the front end of its transverse suture 12
11. Legs entirely black. . . . . 6a. **obscura obscura** Banks
    Legs and basal part of abdomen more or less marked or tinged with light rufous . . . . 6b. **obscura delicata** Banks
12. Third cubital cell about 1.45 as long as high, receiving the second recurrent vein a little beyond its middle; mesopleuron with or without a very short oblique carina at the front end of its transverse suture. 7. **euphorbiae** Viereck
    Third cubital cell about 1.8 as long as high, receiving the second recurrent vein at or a little before its middle; mesopleuron with a short or relatively long oblique carina at the front end of its transverse suture. 13
13. Temple with about 8 suberect long white hairs; clypeus about 0.52 as long on the midline as it is wide, its apical margin usually with a broad, weak, median notch; abdomen without a bluish tinge . . 8. **vogeli**, new species
    Temple with about 30 suberect long white hairs; clypeus about 0.56 as long on the midline as it is wide, its apical margin without a median notch; abdomen with a tinge of bluish iridescence . . . . 9. **cupida** (Cresson)

FEMALES

(Females of *mintaka* and *neglecta* are unknown; it is expected that the former will run to couplet 6 and the latter to couplet 9.)

1. Brush on inner side of hind tibia usually with a complete subapical interruption; mesopleuron with a short oblique carina extending downward from the front end of its transverse suture; coloration of head and body entirely fulvo-ferruginous. ACCEPTA GROUP 2
   Brush on inner side of hind tibia usually continuous to the apex, though often very much narrowed or even interrupted subapically, in the latter case the mesopleuron without an oblique carina extending downward from the front end of its transverse suture; coloration of head and body various . 4
2. Forewing rather uniformly brown, though usually with three weakly distinguished darker cross-bands (pl. 2, fig. 34) . . . . . . 16. **blaisdelli** (Fox)
   Forewing subhyaline, with distinct brown cross-bands (pl. 2, figs. 32, 33) . 3
3. Apical hairless margin of clypeus abruptly widened at the middle so that it has a blunt median tooth; clypeus only weakly impressed sublaterally so that the central half of its apical margin is not distinctly set off from the lateral portions . . . . 15. **conflicta** Banks
   Apical hairless margin of clypeus not widened at the middle, without a median tooth and often its apical edge weakly concave medially; clypeus rather strongly impressed sublaterally so that the central half of its apical margin is distinctly set off from its lateral portions. 17. **accepta** (Cresson)

4. Last tarsal segment with several bristles beneath; basal external longitudinal carina on front coxa strongly curved and ending at about the basal 0.3 of the coxa; a ferruginous species with the wings dark brown, the forewing 9 to 15 mm. long. CORONATA GROUP . . . . 14. **coronata** Banks

Last tarsal segment without bristles beneath; basal external longitudinal carina on front coxa weakly curved and ending near or beyond the midlength of the coxa; species with at least the thorax blackish; or if ferruginous the forewing 4 to 5 mm. long **5**

5. Abdomen rufous or ferruginous; mesopleuron without an oblique carina at the front end of its transverse suture; forewing 4.0 to 5.5 mm. long; brush on inner side of hind tibia subapically very narrow. PARTITA GROUP . **6**

Abdomen black or blue-black; mesopleuron often with a short oblique carina extending downward from the front end of its transverse suture; forewing 5 to 10 mm. long; brush on inner side of hind tibia subapically relatively broad to quite narrow. CUPIDA GROUP **9**

6. Head and thorax fulvo-ferruginous; forewing unusually narrow (0.25 as wide as long) . . . . 3. **pallida** Banks

Head and thorax blackish or mostly so; forewing of normal width **7**

7. Apical hairless margin of clypeus mat, set off from the rest of the clypeus by an indistinct groove. . . . . 4. **seminole,** new species

Apical hairless margin of clypeus polished, set off from the rest of the clypeus by a distinct groove **8**

8. Hind femur black or brown; body pubescence not unusually dense. 1. **partita** Banks

Hind femur rufous, its apex a little infuscate; body pubescence very dense, giving a hoary appearance . . . . 2. **grisea,** new species

9. Pronotum and abdomen dull black, without bluish iridescense. **10**

Pronotum and abdomen with a distinct bluish iridescense. **12**

10. Clypeus with a pair of blunt median apical teeth that are often subobsolete; mesopleuron with a short carina extending obliquely downward from the front end of its transverse groove . . . . 8. **vogeli,** new species

Clypeus with a small sharp median apical tooth; mesopleuron without a carina extending obliquely downward from the front end of its transverse groove. SUBSPECIES OF OBSCURA **11**

11. All femora black . . . . 6a. **obscura obscura** Banks

Middle and hind femora dusky rufous . . . . 6b. **obscura delicata** Banks

12. Forewing subhyaline in its basal 0.6, its apical 0.4 weakly infuscate, the wing 5 to 6.5 mm. long; bluish iridescence of head and body weak; clypeus with a median apical pair of blunt teeth . . . . 12. **norata** Banks

Forewing uniformly fuscous or the base a little paler, the wing 5.5 to 10 mm. long; bluish iridescence of head and body strong **13**

13. Mesopleuron with a conspicuous carina extending obliquely downward from the front end of its transverse groove; propodeum with indistinct transverse wrinkles; pubescense of clypeus very dense . . . 9. **cupida** (Cresson)

Mesopleuron without a carina extending obliquely downward from the front end of its transverse groove; propodeum without wrinkles; pubescence of clypeus not unusually dense **14**

14. Lower half of head with a few (10± on each side) erect whitish to dark brown hairs behind; forewing 5.5 to 7.5 mm. long. 7. **euphorbiae** (Viereck)

Lower half of head with numerous (40± on each side) erect whitish hairs behind; forewing 8.0 to 10 mm. long **15**

15. Clypeus faintly produced medially as a simple rudimentary tooth. 10. **submetallica** (Banks)
Clypeus distinctly produced medially as a weak apical truncate or weakly bilobed projection . . . . 11. **evansi,** new species

PARTITA GROUP

Hairless apical margin of clypeus rather narrow; mesopleuron without an oblique carina at the front end of its transverse groove; propodeum without erect long hairs, with only pubescence; brush on inner side of hind tibia very narrow subapically but usually not interrupted there; subgenital plate of male broadly spatulate or narrowly tectate with a median longitudinal raised area which tapers from a base of appreciable width to a narrow apex which reaches or surpasses the midpoint of the plate.

Fore and middle tibial spurs of male white or whitish, often infuscate basally; hind tibial spurs of male blackish.

This species group includes the Nearctic *partita, grisea, pallida, seminole,* and *mintaka.*

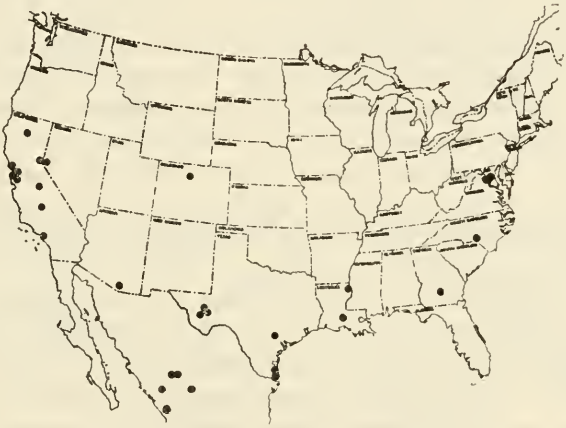


FIGURE 108.—Localities for *Ageniella partita.*

1. *Ageniella (Ageniella) partita* Banks

Ageniella partita Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 244, ♂.
Type: ♂, Brawley, Imperial County, Calif. (Ithaca).
Alasagenia rubineus Dreisbach, 1950, Ent. News, vol. 61, p. 68, ♀ (new synonymy).
Type: ♀, Washington, D. C. (Cambridge).

MALE: Forewing 3.4 to 4.9 mm. long; apical hairless margin of clypeus very narrow, polished, separated from the rest of the clypeus by a fine groove; longer spur of hind tibia about 0.6 as long and about 0.5 as wide as the hind basitarsus; subgenital plate broadly tectate, the apex rounded.

Blackish. Wings hyaline, the apex of the forewing faintly infuscate; fore femur blackish brown, paler apically; middle and hind femora rufous, more or less infuscate basally; tibiae and tarsi dusky rufous to dark brown; spurs of front and middle tibiae white, those of the hind tibia fuscous; first three abdominal segments rufous; seventh tergite with a large whitish spot.

FEMALE: Forewing 3.2 to 6.0 mm. long; pubescence of head and thorax of normal density; apical hairless margin of clypeus narrow, polished, separated from the rest of the clypeus by a small sharp groove.

Black. Clypeus often stained with rufous apically; wings subhyaline, the apical 0.35± of forewing somewhat infuscate; legs dark brown to blackish; abdomen rufous.

The type of *Alasagenia rubineus* does not have teeth on the hind tibia, in spite of the indication in its description that these are present.

SPECIMENS (28♂, 68♀): From Arizona (Nogales); California (Berkeley, Brawley, Lake Britton in Shasta County, Lindsay, Los Angeles County, Menlo Park, Mount Hermon in the Santa Cruz Mts., San Rafael, Sugar Pine in Madera County at 4,300 to 5,000 ft., and Tahoe); Colorado (Poudre Canyon in Larimer County at 5,200 ft.); District of Columbia (Washington); Florida; Georgia (Tifton); Louisiana (Opelousas and Tallulah); Nevada (Reno); North Carolina (Southern Pines); Texas (Brownsville, Gaudalupe River at Victoria, Port Isabel in Cameron County, and Valentine); Virginia (Dunn Loring); and México (Acapulco, El Salto, and Nombre de Dios in Durango, Huauchimango in Puebla, San Blase in Nayarit, Sombrerete in Zacatecas, and Zimapán in Hidalgo).

Collection dates are mostly in July and August, with the following records unusually early and late: May 23 at Valentine, Tex.; June 1 at Washington, D. C.; Sept. 9 at Washington, D. C.; and Sept. 11 at Reno, Nev. A male and a female have been collected on flowers of *Asclepias*, and the following four females were taken with prey: ♀, with immature *Zelotus* sp., Menlo Park, Calif., July 13, 1937, F. X. Williams; 2♀, both with females of *Gnaphosa sericata*, Washington, D. C., June 1945, M. Vogel; ♀, with an immature of *Arctosa littoralis*, Fort Collins, Colo., Aug. 21, 1948, H. E. Evans. A female was taken at Dunn Loring, Va., Aug. 13, 1950, by K. V. Krombein while it was being closely pursued (within 2 to 5 cm.) and somewhat annoyed by two females of *Ceropales hatoda* as it ran along the ground. It had no prey.

This species is transcontinental in the Upper and Lower Austral Zones. Adults are on the wing throughout the summer, being most common in July and August.

2. *Ageniella (Ageniella) grisea*, new species

Male: Unknown.

Female: Forewing 3.3 to 4.0 mm. long; pubescence of head and thorax very dense and rather long, giving a hoary appearance; apical hairless margin of clypeus narrow, polished, separated from the rest of the clypeus by a small sharp groove.

Blackish, but quite hoary from the dense pubescence. Apical part of clypeus fulvo-ferruginous; wings hyaline, the apical third of the forewing weakly infuscate; femora and tibiae fulvo-ferruginous; tarsi dark brown; abdomen rufous.

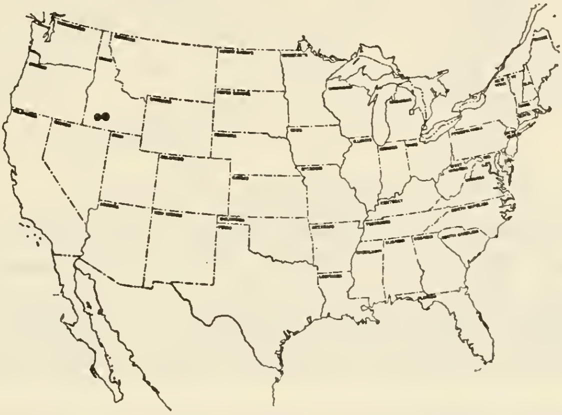


Figure 109.—Localities for *Ageniella grisea.*

Type: ♀, Hollister, Idaho, July 11, 1931, David E. Fox (Washington, USNM 61704).

Paratype: ♀, Wendell, Idaho, Aug. 30, 1928 (Washington).

3. *Ageniella (Ageniella) pallida* Banks

Ageniella pallida Banks, 1945, Psyche, vol. 52, p. 106, ♀. Type: ♀, Austin, Tex. (Cambridge).

Male: Unknown.

Female: Forewing 4.0 to 4.5 mm. long, the wings unusually narrow and short; pubescence of head and thorax a little thinner than usual; apical hairless margin of clypeus moderately wide, weakly mat, not separated from the rest of the clypeus by a distinct groove.

Fulvo-ferruginous. Wings tinted with fulvous, the apical part of forewing somewhat brownish; third tergite with a broad transverse, poorly defined brown band, the second and fourth tergites usually with a similar but narrower band.

Specimens: ♀, Sioux City, Iowa, July 15, 1922, C. N. Ainslie (Washington). ♀, Clay County, Kans., August, J. C. Bridwell

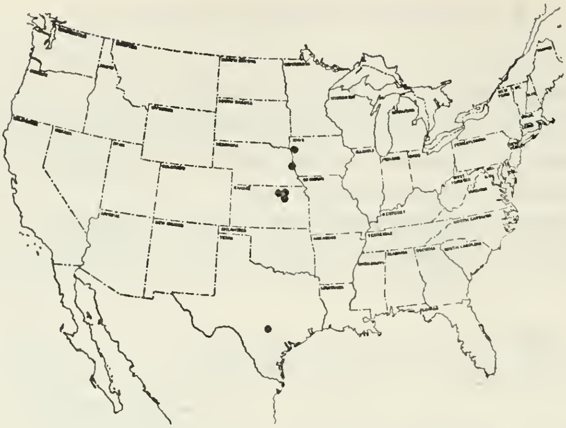


FIGURE 110.—Localities for *Ageniella pallida.*

Washington). 4 ♀, on banks of Kaw River, Manhattan, Kans., Sept. 4 to 18, 1949, H. E. Evans (Evans and Townes). ♀, Manhattan, Kans., Sept. 19, 1930, D. A. Wilbur (Manhattan) ♀, Manhattan, Kans., W. P. Hayes (Washington). ♀, Randolph, Kans., Aug. 18, 1949, H. E. Evans (Townes). ♀, Plattsmouth, Nebr., Sept. 3, 1923, C. B. Philip (St. Paul). ♀ (type), Austin, Tex. (Cambridge).

This is a Great Plains species collected to date in Nebraska, Kansas, and Texas.

4. *Ageniella (Ageniella) seminole*, new species

MALE: Forewing 3.7 mm. long; apical hairless margin of clypeus mat, rather broad, not separated from the rest of the clypeus by a groove; longer spur of hind tibia 0.77 as long and 0.65 as wide as the hind basitarsus; subgenital plate broad, with a round apex.

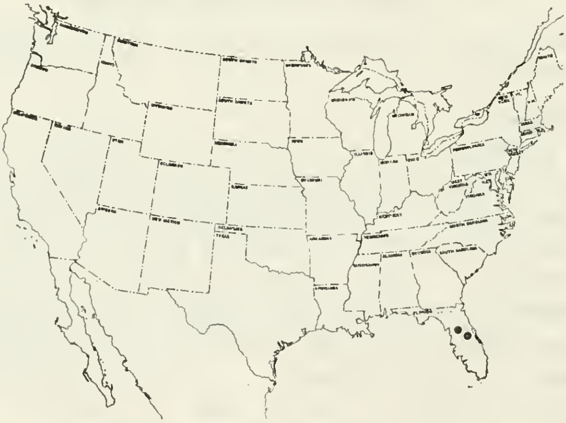


FIGURE 111.—Localities for *Ageniella seminole.*

Blackish. Wings hyaline, the apical part of the forewing a little infuscate; legs beyond coxae dark brown, the spurs of the front and middle tibiae whitish; first three segments of abdomen dark brown, the rest a little darker; seventh tergite mostly light brown.

Female: Forewing 4.2 to 4.6 mm. long; apical hairless margin of clypeus of moderate width, mat but subpolished apically, separated from the rest of the clypeus by a broad weak groove.

Blackish. Clypeus fulvous apically; wings subhyaline, the apical third of the forewing weakly infuscate; legs blackish brown; abdomen rufous, the last two segments brownish.

Type: ♀, Marion County, Fla., Feb. 15, 1929, A. M. Towles (Washington, USNM 61705).

Paratypes: ♂, Seminole County, Fla., June 4, 1929, B. D. Hiers, Jr. (Washington). 2 ♀, Seminole County, Fla., July 19 and Aug. 2, 1929, H. Clark (Washington).

5. *Ageniella* (*Ageniella*) *mintaka* Brimley

Ageniella mintaka Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol 43, p. 202, ♂. Type ♂, Raleigh, N. C. (Raleigh).

Male: Forewing about 4.0 mm. long; apical hairless margin of clypeus very narrow, polished, separated from the rest of the clypeus very narrow, polished, separated from the rest of the clypeus by a fine groove; longer spur of hind tibia about 0.75 as long and 0.7 as wide as the hind basitarsus; subgenital plate narrowly tectate, tapered to a rather pointed apex.

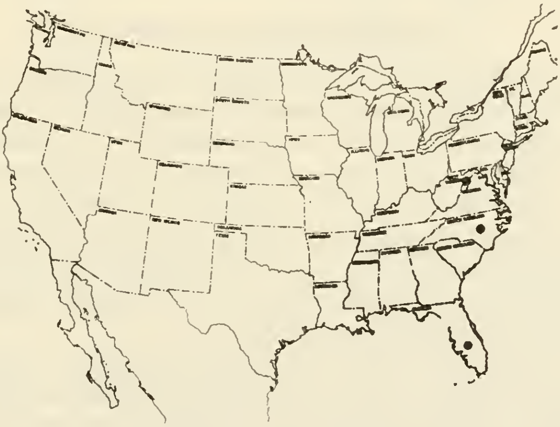


Figure 112.—Localities for *Ageniella mintaka*.

Blackish. Wings hyaline, the apical part of the forewing a little infuscate; legs beyond coxae blackish brown, the spurs of the front and middle tibiae whitish; seventh abdominal tergite with a large whitish spot.

FEMALE: Unknown.

SPECIMENS: ♂, Lake Placid, Highland County, Fla., Apr. 1, 1954, H. E. Evans (Evans). ♂ (type), Raleigh, N. C., June 9, 1927, C. S. Brimley (Raleigh). ♂, Lost River State Park, Hardy County, W. Va., June 30, 1953, K. V. Krombein (Krombein).

CUPIDA GROUP

Hairless apical margin of clypeus usually moderately wide; mesopleuron with or without a short carina extending obliquely downward and backward from the front end of its transverse groove; propodeum without erect hair, only with pubescence; brush on inner side of hind tibia continuous to the apex; subgenital plate of male ligulate or narrowly tectate, the apex rounded.

Tibial spurs and face of both sexes blackish.

The species included are the Nearctic *obscura, euphorbiae, vogeli, cupida, submetallica, evansi, norata,* and *neglecta;* and the Neotropic *Agenia argenteosignata* Spinola 1851, *Pompilus violaceipes* Cresson 1867, *Priocnemis* (*Priocnemella*) *wheeleri* Banks 1925, *Priocnemis* (*Calicurgus*) *molinoi* Banks 1925, *Pseudagenia bruesi* Banks 1928, *Ageniella purpuripes* Banks 1938, and *Priocnemella domingensis* Banks 1944. Except for *purpuripes,* the Neotropic species have not before been referred to *Ageniella.* The species *obscura* occurs in both the Nearctic and Neotropic regions.

6. *Ageniella* (*Ageniella*) *obscura* Banks

MALE: Forewing 4.0 to 4.5 mm. long; clypeus with a small blunt median apical tooth, or sometimes the tooth absent; apical hairless margin of clypeus very narrow and indistinct, or subobsolete (in the other species of the *cupida* group, this margin is of appreciable width and set off from the rest of the clypeus by a small groove); temple without long hairs; mesopleuron without an oblique carina at the front end of its transverse suture; third cubital cell about 1.45 as long as high, receiving the second recurrent vein at its center; seventh sternite narrowly tectate, without erect hairs.

FEMALE: Forewing 4.5 to 5.5 mm. long; clypeus with a small, usually acute, median apical tooth; apical hairless margin of clypeus narrower than in other species of the *cupida* group and separated by only a weak impression; temple without long erect hairs; mesopleuron without an oblique carina at the front end of its transverse groove; propodeum without wrinkles.

This species is represented by the two subspecies below, distinguished by the color of the abdomen of the male and of the legs in both sexes.

6a. *Ageniella (Ageniella) obscura obscura* Banks

Ageniella obscura Banks, 1925, Bull. Mus. Comp. Zool., vol. 67, p. 331, ♀. Type: ♀, Bella Vista, Panamá (Cambridge).

MALE: Black. Wings subhyaline, the apical part of the forewing weakly infuscate; seventh tergite with a large whitish spot.

FEMALE: Black. Wings weakly infuscate, the apical 0.35 of the forewing a little darker.

SPECIMENS: ♀, Opelousas, La., May 1897, G. R. Pilate (Washington). ♂, Opelousas, La., June 15, 1897, G. R. Pilate (Washington). ♀, Austin, Tex., Aug. 5, 1946, H. E. Evans (Evans). ♀, Brownsville, Tex., July 2, 1945 (Washington). ♀, Brownsville, Tex., July 14, 1947, B. Valentine (Evans). ♂, Brownsville, Tex., July 21, 1945 (Washington). 2♂, Brownsville, Tex., 1921, J. C. Bridwell (Washington). ♀, Dallas, Tex., Sept. 28, 1906, R. A. Cushman (Washington). ♀, Fedor, Tex., May 26, 1901 (Cambridge). ♀, Liberty Hill, Tex., July 5, 1937, Mrs. R. W. Strandtmann (Strandtmann). ♂, Montgomery County, Tex., May 4, 1941, R. W. Strandtmann (Strandtmann). ♀, New Braunfels, Tex., June 27, 1917 (Cambridge). ♀, Port Isabel, Cameron County, Tex., June 20 to 23, 1948, H. E. Evans (Evans). ♀, on Rio Grande River at Hidalgo, Tex., June 23 to 25, 1948, H. E. Evans (Evans). ♀, Richmond, Tex., June 22, 1917 (Cambridge). ♀, San Antonio, Tex., May 14, 1906, W. E. Hinds (Washington). ♀, San Antonio, Tex., June 11, 1936, B. Struck (College Station, Tex.). ♀, Victoria, Tex., July 12 to 15, 1946, H. E. Evans (Evans). 2♂, 5♀, on Guadalupe River at Victoria, Tex., June 16, 1948, H. E. Evans (Evans). 2♂, Williamson County, Tex., Oct. 7 and 22, 1933, J. E. Gillaspy (College Station, Tex., and

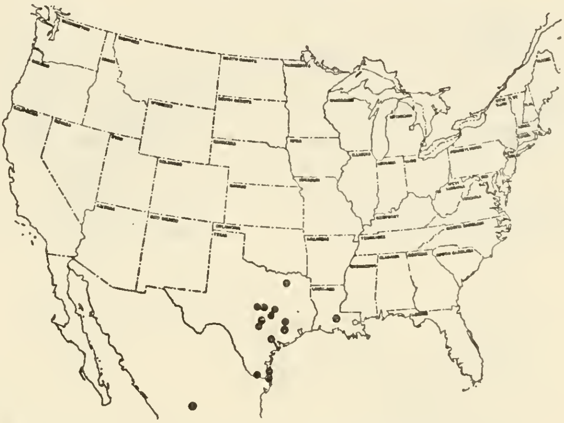


FIGURE 113.—Localities for *Ageniella obscura obscura.*

Townes). ♀, "Limon Chagres River Plantation", Panamá, July 14, 1948, H. F. Dietz (Washington). ♀ (type), Bella Vista, Panamá, July 6, 1924 (Cambridge).

This subspecies occurs from Panamá to southern Texas and Louisiana.

6b. *Ageniella (Ageniella) obscura delicata* Banks

Ageniella delicata Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 174, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Ageniella restricta Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 175, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Male: Blackish. Legs and basal part of abdomen more or less marked or tinged with light ferruginous; seventh tergite with a large whitish spot above. The type of *delicata* is marked with paler as follows: scape beneath, middle and hind femora, and first three abdominal segments fulvo-ferruginous, the base of the first segment and the apical third of the third fuscous; trochanters fulvo-ferruginous, brownish above; fore leg beyond trochanter brownish fulvous; middle and hind tibiae and tarsi brownish. The type of *restricta* is marked with pale as follows: legs beyond coxae brownish; first and second tergites ferruginous except that the first tergite above and basally and the second tergite on its apical 0.3 are fuscous. These two types suggest the color variation to be expected in males of the subspecies.

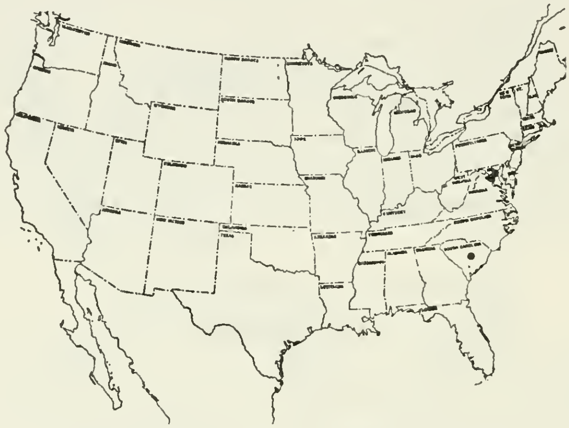


Figure 114.—Localities for *Ageniella obscura delicata*.

Female: Blackish. Wings weakly infuscate, the apical 0.35 of the forewing a little darker; femora and tibiae, or at least the femora, rufous or dusky rufous.

Specimens: ♀, Washington, D. C., Aug. 18, 1943, M. Vogel (Vogel). 2♂ (types of *delicata* and *restricta*), Falls Church, Va., Aug. 22, N. Banks (Cambridge). 3♂, on tulip tree honeydew, Falls

Church, Va., Aug. 22 and 28 and Sept. 6, N. Banks (Cambridge and Raleigh). 2♀, Falls Church, Va., June 25 and July 12, N. Banks (Cambridge). 2♀, Columbia, S. C., July 30 and Aug. 18, 1951, G. and L. Townes (Townes).

This subspecies has been collected from the District of Columbia to South Carolina.

7. *Ageniella* (*Ageniella*) *euphorbiae* (Viereck)

Agenia euphorbiae Viereck, 1902, Proc. Acad. Nat. Sci. Philadelphia, vol. 54, p. 734, ♂. Type: ♂, San Pedro, Calif. (Philadelphia).

Ageniella subaequalis Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 243, ♂. Type: ♂, mountains near Claremont, Calif. (Ithaca).

Male: Forewing 3.3 to 6.5 mm. long; apical margin of clypeus entire, not toothed or notched medially; temple with about eight long suberect hairs; mesopleuron without an oblique carina at the front end of its transverse groove; third cubital cell about 1.45 as long as high, receiving the second recurrent vein at about its basal 0.43; seventh sternite narrowly tectate, without erect hairs.

Black. Wings subhyaline, the apical part of the forewing weakly infuscate; seventh tergite with a large whitish spot.

Female: Forewing 5.5 to 7.5 mm. long; apical hairless margin of clypeus broadened medially, sometimes to make an indistinct median tooth; temple with about ten long suberect hairs; mesopleuron without an oblique carina at the front end of its transverse groove or sometimes with a short indistinct one; propodeum without wrinkles.

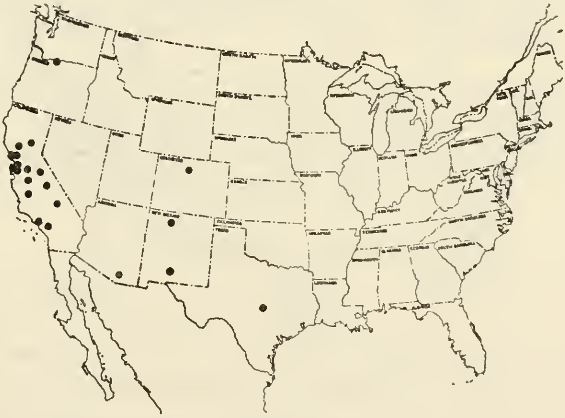


Figure 115.—Localities for *Ageniella euphorbiae*.

Black. Head, pronotum, mesonotum, and abdomen with a dark blue irridescence; forewing fuscous; hind wing subhyaline.

Specimens (15♂, 18♀): From Arizona (Carr Canyon in the Huachuca Mts.); British Columbia (Vernon); California (Benicia, Berkeley, mountains near Claremont, Huntington Lake in Fresno County at 7,000 ft., Lindsay, Los Banos, Marin County, Meadow Valley in Plumas County at 3,500 to 4,000 ft., Napa, Pinecrest in Tuolumne County, Priest Valley in Monterey County at 2,300 ft., north end of San Bruno Mts., San Francisco, San Pedro, Santa Cruz County, Tracy in San Joaquin County, and Whitney Portal in Inyo County); Colorado (Poudre Canyon in Larimer County at 5,200 ft.); New Mexico (Jemez Springs at 6,400 ft. and La Cueva in the Organ Mts. at about 5,300 ft.); and Oregon (Hood River). Collection dates range from May 22 at Los Banos, Calif., to "October" in Santa Cruz County, Calif. Most are in July and August.

This species is common in California and has been taken sparingly in British Columbia, Oregon, Arizona, New Mexico, Texas, and Colorado. It seems most abundant in the last half of the summer.

8. *Ageniella* (*Ageniella*) *vogeli*, new species

MALE: Forewing 4.0 to 5.5 mm. long; apical margin of clypeus usually with a broad weak median notch; temple with about eight long suberect hairs; mesopleuron with a weak carina extending obliquely downward from the front end of its transverse groove, the carina about 0.8 as long as the width of the front femur; third cubital cell about 1.7 as long as high, receiving the second recurrent vein at or just basad of the middle; seventh sternite narrowly tectate, without erect hairs.

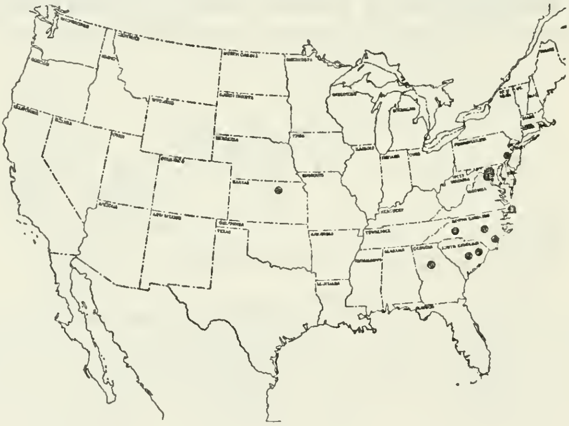


FIGURE 116.—Localities for *Ageniella vogeli*.

Black. Wings subhyaline, margined apically with light fuscous; seventh tergite with a large whitish spot.

FEMALE: Forewing 5.8 to 6.8 mm. long; clypeus with a broad weak median apical notch; temple without long suberect hairs; mesopleuron with a carina extending obliquely downward from the front end of its transverse groove, the carina about as long as the width of the front femur; propodeum without wrinkles.

Black. Wings subhyaline, the apical 0.35 of the forewing somewhat infuscate and the apex of the hind wing faintly infuscate.

TYPE: ♀, transporting an immature *Lycosa avara*, Washington, D. C., Sept. 5, 1946, M. Vogel (Washington, USNM 61706).

PARATYPES: ♀, Washington, D. C., Aug. 23, 1948, D. Shappirio (Shappirio). 2♀, Atlanta, Ga., June 30, 1934, and July 23, 1947, P. W. Fattig (Washington and Townes). ♀, Manhattan, Kans., Sept. 4, 1949, H. E. Evans (Evans). ♀, Takoma Park, Md., Sept. 5, 1942, H. and M. Townes (Townes). ♂, Crabtree Meadows at 3,600 ft. in Yancey County, N. C., Aug. 25, 1950, Townes family (Townes). 2♀, Kill Devil Hills, N. C., July 1 and 18, 1950, K. V. Krombein (Krombein). ♀, Raleigh, N. C., Oct. 1, 1949, H. Townes (Townes). ♀, Wake County, N. C., July 28, 1951, H. and M. Townes (Townes). 4♂, 4♀, at *Liriodendron* honeydew, Wallace, N. C., June 17, 1949, H. Townes (Townes). ♀, Pennsylvania, Melsheimer (Cambridge). 7♂, Columbia, S. C., June 10, July 6 and 7, and Aug. 3, 6, and 16, 1951, G. F. Townes (Townes). 3♀, Columbia, S. C., July 4 and Aug. 6 and 24, 1951, G. F. Townes (Townes). 2♀, Florence, S. C., July 26, 1950, H. Townes (Townes). ♂, Arlington, Va., July 25, 1948, K. V. Krombein (Krombein). 2♂, Dunn Loring (near Vienna), Va., Aug. 6, 1949, and Aug. 22, 1948, K. V. Krombein (Krombein). 2♂, Falls Church, Va., Aug. 10 and Aug. 23, N. Banks (Cambridge).

This species occurs in the Carolinian faunal area. Females have been taken in mesophytic open woods, crawling among the twigs of bushes and looking much like *Camponotus herculeanus*. Adults are on the wing from the middle of June through September.

9. *Ageniella (Ageniella) cupida* (Cresson)

Pompilus (Agenia) cupidus Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1 p. 122, ♀. Type: ♀, West Virginia (Philadelphia).

MALE: Forewing 6.0 to 7.0 mm. long; clypeus about 0.56 as long as wide (in most other species of the *cupida* group, the clypeus is proportionally a little shorter); clypeus without a median apical tooth or with a very weak one; temple with about 30 long suberect hairs; mesopleuron with a carina extending obliquely downward from the front end of its transverse groove, the carina about as long as the width of the front femur; third cubital cell about 1.8 as long as high, receiving the second recurrent vein at the middle; subgenital plate narrowly tectate, without erect hairs.

Black. Wings hyaline, margined apically with light fuscous; abdomen with a weak bluish iridescence; seventh tergite with a large white spot.

Female: Forewing 7.0 to 8.5 mm. long; apical hairless margin of clypeus with a broad weak median tooth, the rest of the clypeus very densely pubescent; temple with about 5 long suberect hairs below, near the occipital carina; propodeum with weak, irregular, transverse wrinkles.

Black. Head, pronotum, mesonotum, legs, and abdomen with a strong, dark blue iridescence; forewing fuscous; hind wing subhyaline, its apical part weakly infuscate.

Specimens: ♀, Poudre Canyon at 5,200 ft., Larimer County, Colo., Aug. 19 to 22, 1948, H. E. Evans (Evans). ♂, Atlanta, Ga., June 23, 1938, P. W. Fattig (Washington). ♀, Sioux City, Iowa, Aug. 26, 1920, C. N. Ainslie (Washington), ♀, on flowers of *Euphorbia marginata,* Manhattan, Kans., H. E. Evans (Townes). ♀, Chaffee, N. Y., Aug. 6, 1934, J. G. Franclemont (Krombein). ♀, Ithaca, N. Y., July 25, 1890 (Cambridge). ♀, Grand Canyon, Pa., Aug. 2, 1946, S. W. Frost (Evans). ♀, Highspire, Pa., Aug. 21, 1909, W. S. Fisher (Cambridge). ♂, Dunn Loring (near Vienna), Va., July 13, 1947, K. V. Krombein (Krombein). 2♂, Dunn Loring, Va., July 22, 1951, K. V. Krombein (Krombein and Townes). ♀, Guatemala City, Guatemala, June 12, 1923, E. G. Smyth (Washington). 2♀, Teotihuacán, "Pyr.," México, July 7, 1951, H. E. Evans (Evans and Townes).

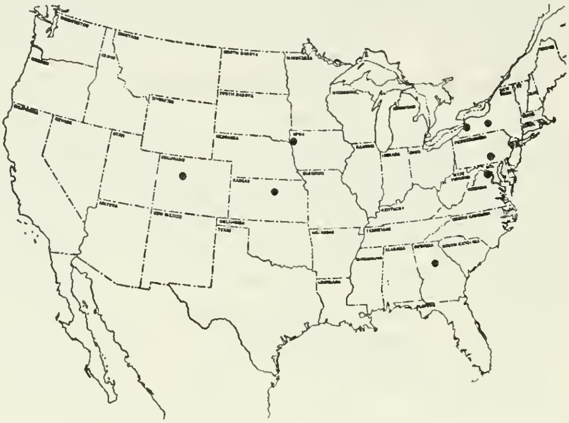


Figure 117.—Localities for *Ageniella cupida.*

This is a widely distributed but uncommon species. It has been taken from New York to Guatemala, and as far west as the Rocky Mountains.

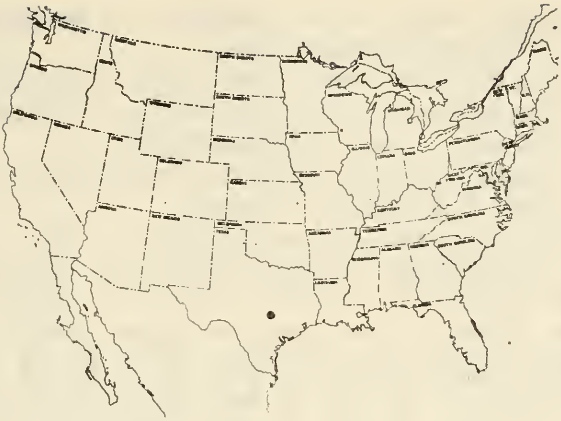


FIGURE 118.—Locality for *Ageniella submetallica.*

10. *Ageniella (Ageniella) submetallica* (Banks)

Pseudagenia submetallica Banks, 1917, Bull. Mus. Comp. Zool., vol. 61, p. 108, ♀. Type: ♀, Austin, Tex. (Cambridge).

MALE: Unknown.

FEMALE: Forewing 8.0 mm. long. Similar in structure and color to *A. euphoribae* except that it is slightly larger, the temple has about 40 long hairs, and the clypeus is as in *A. cupida.*

SPECIMEN: ♀ (type), Austin, Tex. (Cambridge).

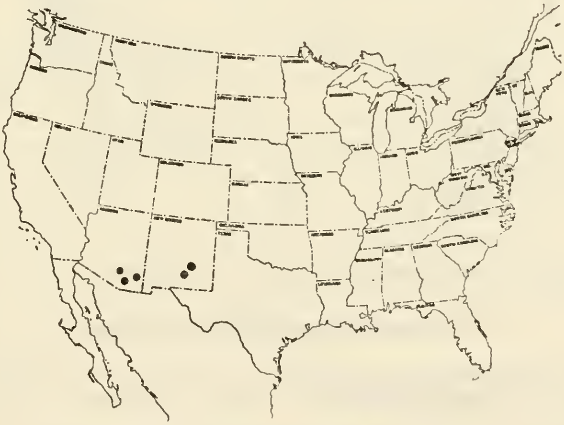


FIGURE 119.—Localities for *Ageniella evansi.*

11. *Ageniella (Ageniella) evansi*, new species

MALE: Unknown.

FEMALE: Forewing 7.5 to 10.0 mm. long; apical hairless margin of clypeus broadened medially into a weak truncate or slightly bilobed projection; temple with about 40 long suberect hairs; mesopleuron without an oblique carina at the front end of its transverse groove; propodeum without transverse wrinkles.

Black. Head, pronotum, mesonotum, femora, tibiae, and abdomen with a dark blue iridescence; forewing infuscate, a little paler basally; hind wing subhyaline, its apex a little infuscate.

TYPE: ♀, Mount Lemmon at 9,000 ft., Santa Catalina Mts., Ariz., Aug. 2 to 4, 1948, H. E. Evans (Ithaca).

PARATYPES: 2♀, Madera Canyon at 6,500 ft., Santa Rita Mts., Ariz., July 30, 1948, H. E. Evans (Evans and Washington). ♀, Rustlers Park at 9,000 ft., Chiricahua Mts., Ariz., July 7 to 8, 1948, H. E. Evans (Evans). ♀, with prey (immature *Lycosa* sp.), Cloudcroft, N. Mex., 9,000 ft., July 26, 1948, H. E. Evans (Evans). ♀ (lacking abdomen), South Fork of Eagle Creek at about 8,000 ft., White Mts., N. Mex., Aug. 16, C. H. T. Townsend (Washington). 2♀, Teotihuacán, "Pyr.," México, July 7, 1951, H. E. Evans (Evans and Townes).

This species is known only from México and the mountains of Arizona and New Mexico at 6,500 to 9,000 ft. altitude.

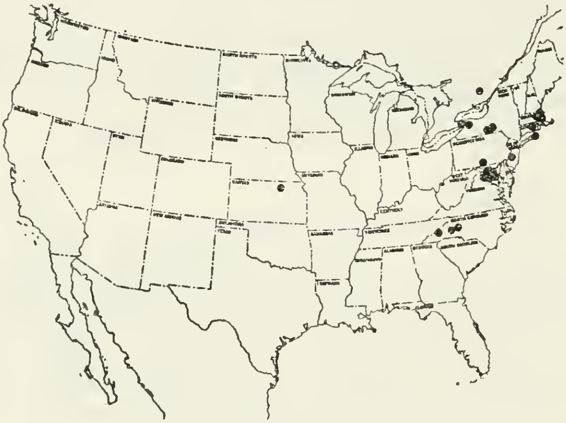


FIGURE 120.—Localities for *Ageniella norata.*

12. *Ageniella* (*Ageniella*) *norata* Banks

Ageniella norata Banks, 1914, Journ. New York Ent. Soc., vol. 22, p. 305, ♂. Lectotype: ♂, Niagara Falls, N. Y., July 31, 1910, M. C. Van Duzee (Cambridge).

Ageniella cupidella Banks, 1915, Canadian Ent., vol. 47, p. 400, ♀. Type: ♀, Ridgeway, Ont. (Cambridge).

MALE: Forewing 4.5 to 5.5 mm. long; clypeus without a median apical tooth or a notch; temple with about 15 long subcrect hairs; mesopleuron without an oblique carina at the front end of its transverse groove, or sometimes with a short weak one; third cubital cell about 1.7 as long as high, receiving the second recurrent vein at the middle; subgenital plate rather broadly ligulate, slightly decurved, and with scattered erect hairs that are a little longer than the width of the plate, straight, and with their apical 0.25 bent over.

Black. Wings hyaline, margined apically with light fuscous; seventh tergite with a large dirty white spot.

FEMALE: Forewing 5.0 to 6.5 mm. long; apical hairless margin of clypeus a little widened medially to make an indistinct median tooth; temple with about ten long suberect hairs; mesopleuron without an oblique carina at the front end of its transverse groove; propodeum without wrinkles.

Black. Head, pronotum, mesonotum, and abdomen with a rather weak, dark, greenish blue iridescence; wings subhyaline, the apical 0.35 of the forewing somewhat infuscate and the apical part of the hind wing weakly infuscate.

SPECIMENS (30 ♂, 31 ♀): From Connecticut (East Hartford); District of Columbia (Washington); Indiana (Mineral Springs); Kansas (Onaga); Maryland (Cabin John and Glen Echo); Massachusetts (Sherborn, South Natick, and Wellesley); New Jersey (Chatsworth in Burlington County); New York (Enfield Glen in Tompkins County, Gardiners Island, Ithaca, and Niagara Falls); North Carolina (Crabtree Meadow at 3,600 ft. in Yancey County, Hamrick, and Hot Springs); Ontario (Ridgeway); Pennsylvania (Mount Holly Springs); Quebec (Aylmer); and Virginia (Arlington, Falls Church, and Rosslyn).

Dates of collection fall mostly between July 10 and Sept. 8. The earlier and later dates on record are July 8 at Falls Church, Va.; July 21 at Niagara Falls, N. Y.; July 23 at Ithaca, N. Y.; July 24 at Onaga, Kans., in Burlington County, N. J., and at Washington, D. C.; Sept. 6 at Falls Church, Va., Sept. 7 at Ridgeway, Ont., Sept. 8 at Aylmer, Que., and Sept. 23 at Cabin John (near Washington, D. C.), Md. Seven of the collected lots are definitely recorded from woods. Included in these is a collection of 11 ♂, 6 ♀ from "dense woods," and a collection of 2 ♀ taken "on bushes in open woods."

This is a woodland species of the Alleghenian and Carolinian faunas. There seems to be a single generation a year; it emerges late in July and is on the wing into early September.

13. *Ageniella* (*Ageniella*) *neglecta* Banks

Ageniella neglecta Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 176, ♂. Type: ♂, Boulder, Colo. (Cambridge).

MALE: Forewing 3.3 to 4.5 mm. long; apical margin of clypeus without a median apical tooth or a notch; temple with about four long suberect hairs; mesopleuron without an oblique carina at the front end of its transverse groove; third cubital cell about 1.6 as long as high, receiving the second recurrent vein at the apical 0.4; subgenital plate narrowly ligulate, somewhat decurved, with a marginal row of erect

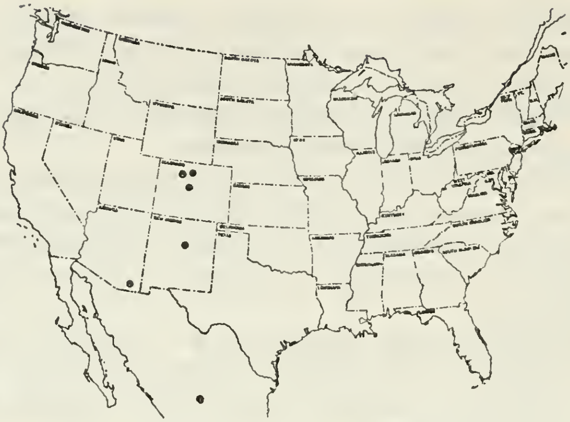


FIGURE 121.—Localities for *Ageniella neglecta.*

hairs that are longer than the width of the sternite and incurved, and with a median row or band of ascending hairs about 0.6 as long as the marginal ones.

Black. Wings subhyaline, the apical part of the forewing weakly infuscate; seventh tergite with a large white spot.

FEMALE: Unknown.

SPECIMENS: ♂, Patagonia, Ariz., June 24, 1933, R. H. Beamer (Lawrence). ♂ (type), Boulder, Colo. Aug.? 26, 1908, S. A. Rohwer (Cambridge). ♂, Fort Collins, Colo., June 15, 1896, C. F. Baker (Washington). 3 ♂, visiting honeydew on *Salix*, Poudre Canyon at 5,200 ft., Larimer County, Colo., Aug. 19 to 22, 1948, H. E. Evans (Evans and Washington). ♂, Monzano, N. Mex., June 26, 1941, R. H. Beamer (Evans). 9 ♂, 14 miles west of Huauchinango, Puebla, México, June 17, 1951, P. D. Hurd (Berkeley, Evans, and Townes). 9 ♂, 15 kilometers east of Sombrerete, Zacatecas, México, July 28 to 31, 1951, P. D. Hurd (Berkeley). 3 ♂, Teotihuacán, "Pyr.," México, June 15 and July 7, 1951, P. D. Hurd and H. E. Evans (Berkeley, Evans, and Townes).

CORONATA GROUP

Clypeus with its apical hairless margin moderately wide, polished, and separated from the rest of the clypeus by a groove; mesopleuron with a carina extending obliquely downward and backward from the front end of its transverse groove; propodeum without erect hairs, only with pubescence; basal external carina of front coxa strongly curved and ending at about the basal 0.3 of the coxa (weakly curved and ending near the midlength of the coxa in the rest of the genus); brush on inner side of hind tibia continuous to the apex; last tarsal segment of all legs with several stout bristles beneath (these bristles absent in other groups except in most females of the *accepta* group); subgenital plate of male tectate, the apex rounded.

Insect ferruginous with a few very restricted black markings, the wings dark brown.

This species group includes only the Nearctic *coronata*, which ranges from California to British Columbia, and eastward to Utah.

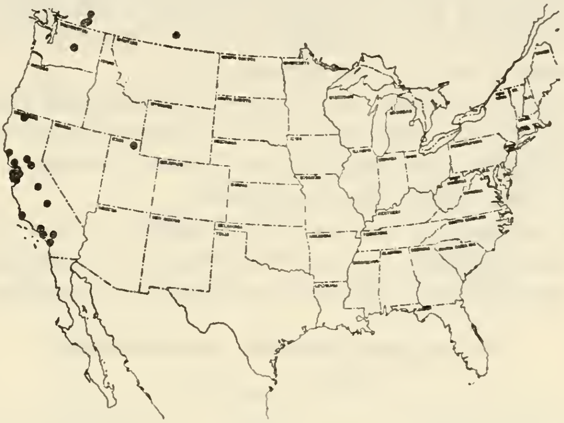


FIGURE 122.—Localities for *Ageniella coronata*.

14. *Ageniella (Ageniella) coronata* Banks

Ageniella coronata Banks, 1919, Bull. Mus. Comp. Zool., vol. 63, p. 242, ♀. Type: ♀, Santa Paula, California (Ithaca).

MALE: Forewing 8.0 to 10.0 mm. long. Ferruginous. Thorax with variable black sutural markings; wings dark brown; base of first abdominal segment black.

FEMALE: Forewing 9.0 to 14.0 mm. long. Ferruginous. Wings dark brown; base of first abdominal segment black.

SPECIMENS (15♂, 27♀): From British Columbia (Lytton, Oliver, Okanagan, and Peachland); California (Berkeley, Camino, Carmel, Chile Bar in El Dorado County, mountains near Claremont, Laguna Beach, Long Canyon at 4,000 ft. in the San Gabriel Mts., Miami Ranger Station in Mariposa County, Mount Hermon in Santa Cruz County, hills back of Oakland, Sonoma County, Redwood City, Penryn, "S. Buenaventura," San Francisco, San Rafael, Santa Cruz Mts., Saticoy, and Telsa in Alameda County); Utah (Logan); and Washington (Grand Coulee).

Dates of collection fall in July and August except for two: June 16 at Redwood City, Calif. and Sept. 15 at Telsa in Alameda County, Calif.

This species occurs in the Transition Zone from British Columbia to central California and eastward to Utah.

ACCEPTA GROUP

Hairless apical margin of clypeus moderately wide; mesopleuron with a short weak carina extending obliquely downward and backward from the front end of its transverse groove; propodeum without or posteriorly with a few erect hairs; brush on inside of hind tibia usually with a subapical interruption; last tarsal segment in the female usually with two or several bristles beneath (these bristles absent in all the other species groups except the *coronata* group); subgenital plate of male narrowly tectate, the apex rounded.

Male with frons usually with an obscure rufous spot near the upper end of the eye (this spot absent in the other species groups); tibial spurs of male blackish or dusky in the Nearctic species. Female with head, body, and appendages ferruginous.

This species group includes *conflicta*, *blaisdelli*, *accepta*, and *Ageniella persimilis* Banks 1931 and an undetermined species, both from Mexico. *Ageniella maya* Banks 1931 is possibly the male of *persimilis*.

15. *Ageniella (Ageniella) conflicta* Banks

PLATE 2, FIGURE 32

Pompilus (Agenia) petiolatus Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 127, ♂. Type: ♂, Illinois (Philadelphia); preoccupied by *Pompilus petiolatus* Say, 1836.

Ageniella accepta var. *conflicta* Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 176, ♀. Type: ♀, Falls Church, Va. (Cambridge).

MALE: Forewing 4.0 to 4.5 mm. long; bristles on flagellum large enough to be conspicuous among the fine erect sense hairs.

Black. Frons with an ill-defined rufous spot near the top of the eye, sometimes subobsolete; flagellum dark brown beneath; wings subhyaline, the apex weakly infuscate; fore tibia fulvous in front; seventh tergite with a large whitish spot.

FEMALE: Forewing 4.0 to 8.5 mm. long; apical hairless margin of clypeus widened medially into a weak tooth; clypeus weakly impressed sublaterally so that the central half of its apical margin is not distinctly set off from its lateral quarters; frons subshining, with fine rather close punctures.

Ferruginous. Wings pale stramineous, the hind wing sometimes a little darker apically, the forewing with a brown band over the basal vein and nervulus, and its apical 0.35 brown, this brown area including a large subapical crescent-shaped hyaline area.

SPECIMENS (9 ♂, 90 ♀): From Alabama (Mobile and Thomasville); Alberta (Medicine Hat); Arizona (Douglas and Tucson); California (Coachella, Los Angeles County, and Santa Clara); Colorado (Boulder and Rifle); District of Columbia (Washington); Florida (Marco in Collier County and St. Johns County); Georgia (Head River and Spring Creek); Iowa (Mountain Home and Sioux City); Kansas (Clay County, Dickinson County, Grant County, Manhattan, Morton County, and Riley County); Massachusetts (Woods Hole); Nebraska (Halsey); New Jersey (Weymouth); New Mexico (4.3 miles south of Gladstone); New York (Riverhead and Farmingville); North Carolina (Southern Pines) Pennsylvania (Philadelphia); Tennessee (Fentress County); Texas (Austin, El Paso, Fedor, near Fort Davis, and Limpia Canyon in the Davis Mts. at 5,000 ft.); Utah (Orderville in Kane County at 5,500 ft.); Virginia (Arlington, Dunn Loring, Falls Church, and Vienna); and Guatemala (Agutla).

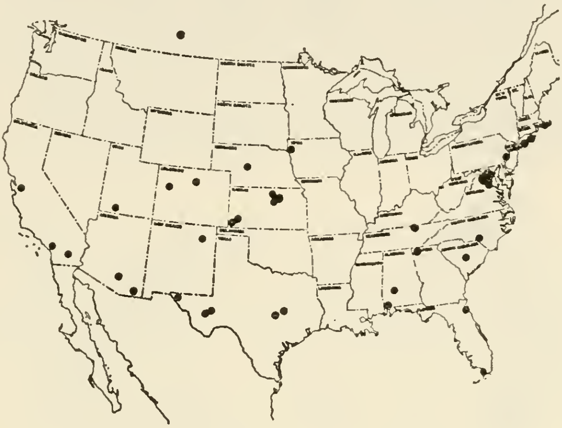


Figure 123.—Localities for *Ageniella conflicta.*

Extensive seasonal data for Washington, D. C., record males on the wing from June 15 to Aug. 6 and females from June 18 to Oct. 5, with most of the females taken in July, August, and September. In warmer climates females have been taken a little earlier and later, as on May 3 at Fedor, Tex., May 18 to 21 at Spring Creek, Ga., May 21 at Coachella, Calif., and Nov. 18 in St. Johns County, Fla. Three of the specimens have with them the prey they were carrying when captured: ♀, Washington, D. C., Sept. 6, 1946, M. Vogel, with an immature of *Lycosa avara;* ♀, Washington, D. C., July 1945, M. Vogel, with an immature of *Lycosa* sp; and ♀, Riverhead, N. Y., Aug. 1, 1917, Wm. T. Davis, with an immature of *Lycosa* sp. Vogel reports that he has taken this species a number of times with prey. In each case the legs had been taken off, but palpi were still present.

This species is transcontinental, mostly in the Upper Austral Zone. Adults are commonest in July, August, and September. Immature specimens of *Lycosa* constitute the prey.

16. *Ageniella (Ageniella) blaisdelli* (Fox)

PLATE 2, FIGURE 34

Pseudagenia blaisdelli Fox, 1892, Ent. News, vol. 3, p. 171, ♀. Type: ♀, San Diego, Calif. (Washington).

Ageniella praestans Banks, 1914, Journ. New York Ent. Soc. vol. 22, p. 305, [♂]. Lectotype: ♂, San Diego, Calif., June, E. P. Van Duzee (Cambridge).

MALE: Forewing 4.0 to 6.8 mm. long; bristles on flagellum not large enough to be conspicuous among the fine erect sense hairs.

Blackish. Frons with a poorly defined rufous spot near the top of the eye, sometimes almost or quite obsolete; flagellum fulvous or strongly tinged with fulvous beneath; wings subhyaline, the apex of the forewing weakly infuscate; legs beyond trochanters dark brown to blackish; seventh tergite with a large whitish spot.

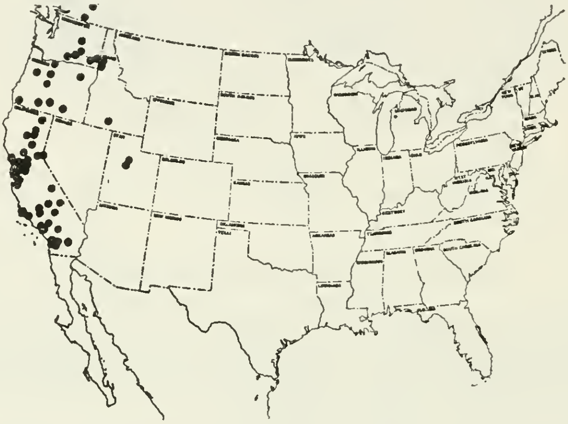


FIGURE 124.—Localities for *Ageniella blaisdelli.*

FEMALE: Forewing 5.0 to 8.5 mm. long; apical hairless margin of clypeus widened medially into a weak tooth; clypeus weakly impressed sublaterally so that the central half of its apical margin is not distinctly set off from its lateral quarters; frons almost mat with fine, very close punctures.

Ferruginous. Hind wing faintly tinged with brown, a little darker apically; forewing brown, a little paler basally and a little darker over the basal vein and nervulus and with a crescent-shaped faintly paler subapical area. The forewing thus has a suggestion of the banded color pattern characteristic of *A. conflicta* and *A. accepta*, but its general appearance is rather uniformly brown.

SPECIMENS (45 ♂, 112♀): From British Columbia (Okanagan and Vernon); California (Adelanto, Benicia, Berkeley, Big Basin in Santa Cruz County, Camino, Chile Bar in El Dorado County, Claremont, Davis, Mount Frazier in Kern County, Glenwood, Hallelujah Junction in Lassen County, Hemet in Riverside County, La Crescenta, La

Jolla, Lake Almanor in Plumas County, Lemon Cove in Tulare County at 500 ft., Lindsay, Lompoc, Los Angeles County, Modoc County, Monterey, Muir Woods, Mount Diablo in Contra Costa County, Napa, Plenty in Butte County, Quincey, Russian River at Mesa Grande, San Diego, San Druno, San Jacinto Mts., San Juan Capistrano, San Rafael, Santa Barbara, Shafter, Sisson, Stanford University, Stockton, Sugar Pine in Madera County at 4,300 to 5,000 ft., Tahoe, Tamales Bay near Marshalls, Tehachapi, Telsa in Alameda County, and Tracy in San Joaquin County); Idaho (Jerome, Lewiston, and at 4,000 ft. on Moscow Mt. near Moscow); Oregon (Antelope Mt. in Harney County at 6,500 ft., Ashland, Blooming, Brookings, Corvallis, Grizzly Butte, Hood River, Klamath Lake, La Grande, and Summerville); Utah (Payson and Salt Lake); and Washington (Connell, Grand Coulee, Pullman, Ritzville, 20 miles south of Tappenish, and Wawawai).

Collection dates for males are mostly from July 9 to Sept. 25; outside these dates is a record for May 22 at Plenty in Butte County, Calif., one for June at San Diego, Calif.; and one for June 4 at Klamath Lake, Oreg. Female collections are mostly from July 7 to Oct 3, with outside records as follows: May 27 at Glenwood, Calif.; June 18 at Berkeley, Calif.; June 25 at Shafter, Calif.; July 2 at Vernon, British Columbia; Oct 4 at Stanford University, Calif.; Oct 15 at Telsa, Calif.; and Nov. 5 at Monterey, Calif.

This is a common species of the Transition and Upper Austral Zones from southern British Columbia to southern California. There are a few records from Idaho and Utah. Adults are on the wing mostly in July, August, and September.

17. *Ageniella* (*Ageniella*) *accepta* (Cresson)

PLATE 2, FIGURE 33

Pompilus (*Agenia*) *acceptus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 130, ♀. Type: ♀, Georgia (Philadelphia).

Pseudagenia texana Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 125, ♂. Lectotype: ♂, Fedor, Lee County, Tex., June 18, 1909, Birkmann (Cambridge).

Ageniella adara Brimley, 1934, Ent. News, vol. 45, p. 41, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

MALE: Forewing 4.0 to 5.0 mm. long; bristles on flagellum large enough to be conspicuous among the fine erect sense hairs.

Blackish. Frons with a poorly defined rufous spot near the top of the eye, sometimes almost or quite obsolete; flagellum fulvous beneath; wings hyaline, the apex of the forewing weakly infuscate; femora, or at least the hind femur, fulvous, more or less brownish basally; tibiae fulvous to medium brown; seventh tergite with a large whitish spot.

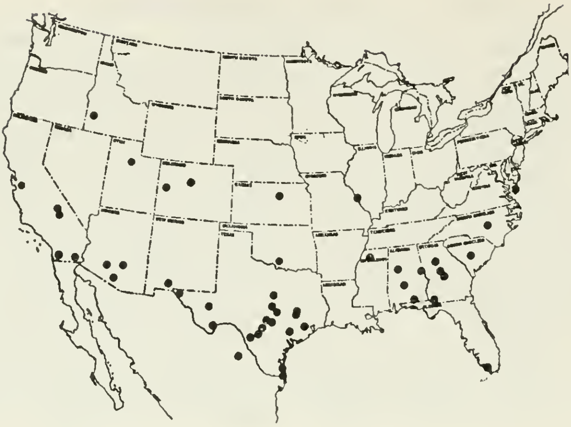


Figure 125.—Localities for *Ageniella accepta*.

Female: Forewing 5.0 to 8.0 mm. long; apical hairless margin of clypeus not widened at the middle, without a median tooth and often its apical edge concave medially; clypeus rather strongly impressed sublaterally, so that the central half of its apical margin is distinctly set off from its lateral quarters; frons almost mat, with fine, very close punctures.

Ferruginous. Wings pale stramineous, the hind wing sometimes a little darker apically, the forewing with a brown band over the basal vein and nervulus, and its apical 0.35 brown, this brown area including a large subapical crescent-shaped hyaline area. The wing markings average a little heavier than in the similarly colored *A. conflicta*.

Specimens (52 ♂, 71 ♀): From Alabama (Auburn, Florala, Selma, and Tuscaloosa); Arizona (Mariposa Mts., Quijotoa in Pima County, and Tempe); California (Imperial County, Lemon Cove in Tulare County at 500 ft., National City, and Wood Lake in Tulare County); Colorado (Boulder and Grand Junction); Georgia (Bainbridge, Griffin, Milner, and Silver Lake in Fulton County); Idaho (Boise); Kansas (Riley County); Mississippi (Oxford); Missouri (St. Louis); New Mexico (Mesilla); North Carolina (Raleigh); Oklahoma (Durant and "Wichita N.F."); Texas (Bexar County, Brazos County, Brownsville, College Station, Dallas, Dimmit County, El Paso, Fedor, Frio State Park in Frio County, Groesbeck, Limpia Canyon in the Davis Mts. at 5,000 ft., McDade, Port Isabel in Cameron County, Richmond, Rio Grande in Brewster County, Rock Island, Victoria, and Waco); Utah (Bountiful); Virginia (Cape Charles); and México (Las Ruscias at Múzquiz in Coahuila).

Adults seem to be on the wing throughout the warmer months. The earliest collection date is Apr. 10 at Brownsville, Tex., and the latest Oct. 24 at Victoria, Tex. Many specimens of both sexes taken at Raleigh, N. C., indicate that the period of greatest abundance there is July, August, and September. Both sexes have been taken commonly at nectaries of *Cassia nictitans*, and the species has been collected also on *Euphorbia marginata*, *Baccharis glutinosa*, and *Bifora americana*. The females seem to hunt primarily on ground with sparse, short vegetation such as on run-down lawns or abandoned eroded fields. They run over the ground with the abdomen tucked forward in a way that gives an appearance like that of *Pogonomyrmex*. There is also a resemblance to some female mutillids. When at nectaries among vegetation they crawl about with the abdomen in a normal position and look much like a large *Formica pallide-fulva*. Females are slow to take flight, which increases their antlike appearance.

This species is transcontinental in the Lower Austral Zone. Adults are on the wing in the warmer months.

Subgenus *Ameragenia* Banks

Ameragenia Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 125. Type: *Ameragenia irene* Banks; monobasic.

Hairless apical margin of clypeus not separated from the rest of the face by a groove, or sometimes separated by a groove; mesopleuron without an oblique carina at the front end of its transverse groove; propodeum with many long erect hairs; brush on inner side of hind tibia continuous to the apex; spines on tibiae, especially in the female, numerous, stout, and divergent, in the female the hind tibia often somewhat tuberculate at the bases of the spines; forewing with the second cubital cell usually rather short and the third long, the third cubital cell receiving the second recurrent vein at about its basal 0.35 (in the other subgenera receiving the second recurrent vein near or beyond its middle); sixth sternite of male with a median apical, weakly raised, rounded ridge, on each side of which the sternite is impressed; subgenital plate narrowly tectate, variable.

Coloration of tibial spurs of male variable.

This subgenus includes *salti*, *fasciata*, and *striga*, which are Neotropic elements reaching the southern borders of the United States, and the strictly Neotropic *Pompilus novellus* Cresson 1869, *Pseudagenia anconis* Banks 1925, *Priocnemis* (*Priocnemis*) *zeteki* Banks 1925, *Priocnemis ursula* Banks 1944, *Priophanes eudora* Banks 1945, *Priophanes insolens* Banks 1946, *Priophanes marcida* Banks 1946, *Priophanes plagosa* Banks 1946, *Ameragenia cleora* Banks 1946, *Ameragenia dolorosa* Banks 1946, *Ameragenia fabricii* Banks 1946, *Ameragenia festina* Banks 1946, *Ameragenia increta* Banks 1946, *Ameragenia irene* Banks 1945, *Ameragenia notabilis* Banks 1946, *Ameragenia partida* Banks 1946, *Ameragenia pretiosa* Banks 1946, *Ameragenia similaris* Banks 1946, *Ameragenia thione* Banks 1946, and

Ageniella alternata Banks 1946. None of the above have been placed previously in both the genus *Ageniella* and subgenus *Ameragenia.*

This subgenus is the dominant one of the genus in South America and is well represented also in Central America.

Keys to the Nearctic species of subgenus Ameragenia

MALES

(The male of only one Nearctic species (*salti*) is known; probably the habitat of this species (Florida) and many features in its coloration will easily distinguish it from other Nearctic males.)

FEMALES

1. Face and clypeus fulvous; forewing uniformly hyaline; habitat: Florida. 3. **salti** (Banks)

Face and clypeus black; forewing hyaline, banded with fuscous; habitat: México and southern Texas 2

2. Femora and scape black . . . . 1. **striga,** new species

Femora rufous; scape fulvous . . . . 2. **fasciata,** new species

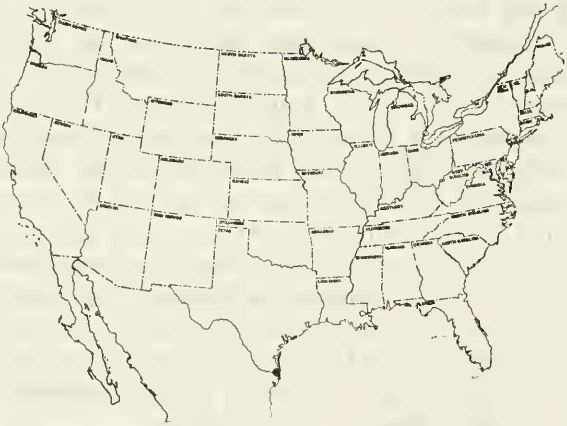


Figure 126.—Locality for *Ageniella striga.*

1. *Ageniella* (*Ameragenia*) *striga,* new species

Male: Unknown.

Female: Forewing 4.7 mm. long; apical hairless margin of clypeus narrow, separated from the rest of the clypeus by a distinct furrow; tibial bristles a little sparser and shorter than usual for the subgenus; long erect hair on propodeum a little sparser than usual for the subgenus.

Black. Flagellum brown, paler beneath; wings hyaline, the forewing with a fuscous band beneath the outer end of the stigma, and its apex faintly infuscate.

Type: ♀, Brownsville, Tex., Aug. 1945, collected by Shiller and Moreland in connection with a DDT experiment (Washington, USNM 61707).

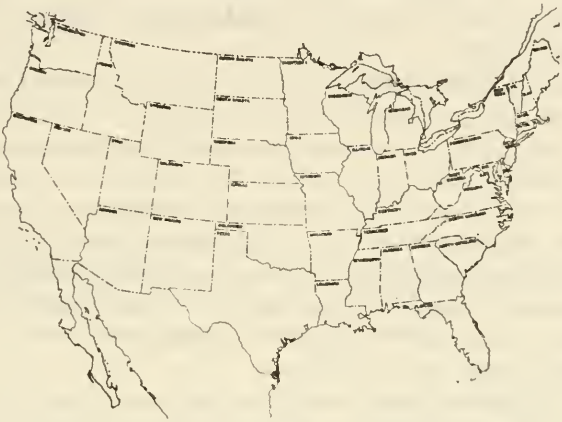


Figure 127.—Locality for *Ageniella fasciata.*

2. *Ageniella (Ameragenia) fasciata*, new species

Male: Unknown.

Female: Forewing 6.5 to 8.0 mm. long; apical hairless margin of clypeus rather narrow, mat, separated from the rest of the clypeus by a distinct furrow; long erect hairs on propodeum numerous; tibial bristles numerous and long.

Black. Antenna dark brown; front tibia in front and its femur apically stained with rufous; middle and hind femora and tibiae rufous, the femora basally and the tibiae apically infuscate; tarsi dark brown; wings hyaline, the forewing with a small faint fuscous mark over the nervulus and lower part of the basal vein, the apex infuscate, and a fuscous transverse band below the outer end of the stigma.

This species is close to *Pompilus novellus* Cresson 1869, from México; however, the type of *novellus* lacks an apical dark mark on the forewing and has a larger darker mark on the basal vein than in *fasciata.*

Type: ♀, Brownsville, Tex., Aug. 1945, collected by Shiller and Moreland in connection with a DDT experiment (Washington, USNM 61708).

Paratype: ♀, Córdoba, México, Jan. 1, 1941, G. E. Bohart (Berkeley).

3. *Ageniella* (*Ameragenia*) *salti* (Banks)

Priocnemella salti Banks, 1928, Studies on Cuban insects (Harvard Univ. Press), vol. 1 p. 6, ♀. Lectotype: ♀, Soledad, Cuba, Feb. 16, 1925, G. Salt (Cambridge).

Priocnemis osceola Banks, 1939, Canadian Ent., vol. 71 p. 230, ♀. Lectotype: ♀, Orlando, Fla., April 18, Paige (Cambridge).

MALE: Forewing 4.5 mm. long; propodeum with long erect hairs; seventh sternite short spatulate, a little convex, with a weak median longitudinal carina.

Blackish. Face and clypeus with a median fulvous stripe extending from between the antennae nearly to the apex of the clypeus, otherwise white with the white extending to the lower lateral corner of the frons; legs fulvous, the upper side of the hind coxa infuscate and the spurs of the middle and hind tibiae white; abdomen beneath tinged with fulvous, the underside of the first segment definitely fulvous.

FEMALE: Forewing 6.0 to 8.5 mm. long; apical hairless margin of clypeus polished, separated from the rest of the clypeus by an indistinct groove; propodeum with numerous long erect hairs; tibial bristles numerous and long.

Blackish. Face, clypeus, mouth parts, scape, and pedicel fulvo-ferruginous; flagellum brown above, fulvous beneath; frons and mesonotum with a greenish iridescence; wings hyaline; underside of coxae, more or less of underside of trochanters, and femora except above, dusky fulvous; tibiae and tarsi dark brown; abdomen laterally, apically, and ventrally dusky fulvous, the central part of its underside partly fuscous.

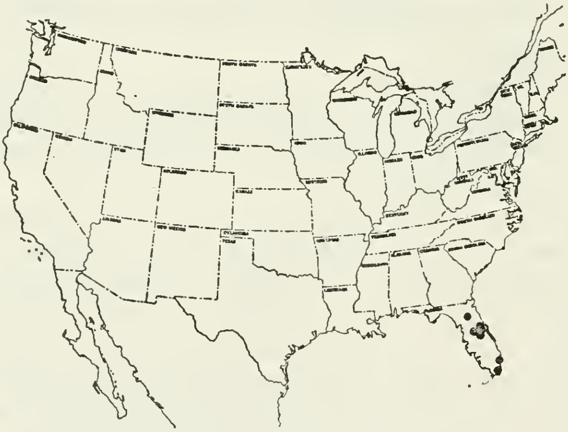


FIGURE 128.—Localities for *Ageniella salti.*

SPECIMENS: ♀, Gainesville, Fla., Feb. 17, 1923, T. H. Hubbell (Ann Arbor). ♀, Miami, Fla., "3–31," J. N. Knull (Washington). ♀ (type of *osceola*), Orlando, Fla., Apr. 18, Paige (Cambridge). ♀, Miami, Fla. (Washington). ♀, Orange County, Fla., Apr. 18, 1930, W. M. Loe

(Washington). ♀, Orange County, Fla., June 14, 1929, E. T. Bates (Washington). ♀, Paradise Key, Fla., Feb. 20, 1919, T. E. Snyder (Washington). 3♀ (one with *Clubiona* sp., ♀ as prey), taken on trees and bushes in dense hammock woods, Paradise Key, Fla., Apr. 6, 7, and 12, 1951, H. and M. Townes (Townes). ♂, Paradise Key, Fla., Mar. 22, 1954, K. V. Krombein (Krombein). 2♀, Seminole County., Fla., Aug. 14 and 15, 1929, H. Clark (Washington). ♀, South Miami, June 5 (Cambridge). ♀, Winter Park, Fla., June 14, 1938, (Washington). ♂, Jarahueca, Oriente, Cuba, July 14 to 18, 1921, S. C. Bruner, (Cambridge). The types of *salti* are from Soledad and near Havana, Cuba.

This species occurs in Florida and Cuba.

Genus *Priocnemella* Banks

Priocnemella Banks, 1925, Bull. Mus. Comp. Zool., vol. 67, p. 337. Type: *Priocnemis* (*Priocnemella*) *fairchildi* Banks; designated by Pate, 1946.

Eragenia Banks, 1946, Bull. Mus. Comp. Zool., vol. 96, p. 421 (new synonymy). Type: *Eragenia infelix* Banks; original designation.

Clypeus broad, short, with a troughlike impression paralleling its lateroapical margin, the apical margin broadly truncate in the female, in the male emarginate, truncate, or specialized; mentum of female with a sparse brush of long slender hairs with curved tips; apex of front tibia on the hind side with a spinelike bristle that is stronger than its neighbors and distinctly recurved (best developed in the female); dorsal edge of hind tibia almost or quite smooth; under side of last tarsal segment without distinct preapical bristles; propodeum without long erect hairs; first tergite without a line separating the epipleuron; female without a pygidial area.

This is a compact genus of Neotropic species, one of which reaches southern Texas. Besides this one, the species of which I have seen the types are *Ageniella isolata* Banks, 1925, *A. rufothorax* Banks 1925, *A. bequaerti* Banks 1945, *A. caloptera* Banks 1945, *A. delila* Banks 1944, *A. amoena* Banks 1946, *Priocnemis fairchildi* Banks 1925, *Eragenia infelix* Banks 1946, and *Lissagenia insignis* Banks 1946. Except for *fairchildi*, these are all new combinations in *Priocnemella*.

Priocnemella tabascoensis (Cameron), new combination

Pseudagenia tabascoensis Cameron, 1891, *in* Biologia Centrali Americana, Hymenoptera, vol. 3, p. 172, ♂. Type: ♂, Teapa, Tabasco, México (London).

Ageniella rufula Banks, 1945, Bol. Ent. Venezolana, vol. 4, p. 117, ♀ (new synonymy). Type: ♀, Minca to Cincinnati, San Lorenzo Mt., Colombia (Cambridge).

MALE: Forewing 5.8 mm. long; propodeum mat, without wrinkles.

FEMALE: Forewing 6.7 to 8.2 mm. long; propodeum finely, weakly wrinkled, the pattern of wrinkling varying in the specimens at hand as follows: wrinkling transverse and somewhat irregularly reticulate

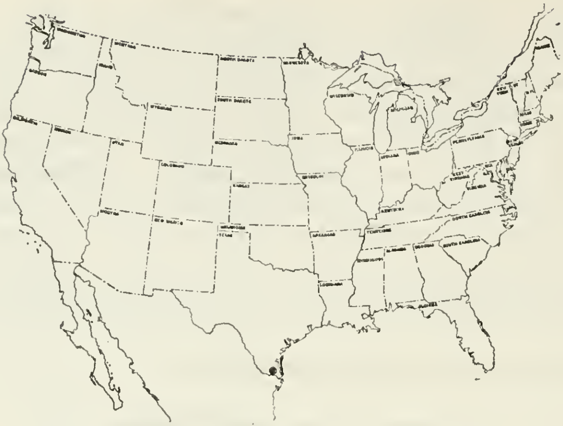


Figure 129.—Locality for *Priocnemella tabascoensis.*

in the type of *rufula* and in the specimen from Ecuador; wrinkling as transverse parallel ridges in the specimen from Panamá; and wrinkling as a faint, fine, irregular reticulation in the specimen from Texas. These three types of wrinkling suggest that there are three species involved, but more specimens are needed to solve this question.

Fulvous. Prosternum and median areas on mesosternum and metasternum fuscous; wings lightly suffused with yellowish brown, the forewing with narrow transverse brown bands along the basal vein and nervulus, just beyond the stigma, and at the apex. These bands are a little narrower in the male and in the female from Panamá than in the other specimens.

The name *tabascoensis* is applied according to Cameron's original description and figure and notes on the type supplied by Mr. I. Yarrow. More specimens may show that more than one species is included here.

Specimens: ♀, Hidalgo County, Tex., 1935 (Krombein). ♂, Santa Emilia, Pochuta, 1,000 m., Guatemala, Feb. to Mar., 1931, J. Bequaert (Cambridge). ♀, Barro Colorado Island, Canal Zone, Panamá, Jan. to Mar., 1944, J. Zetek (Washington). ♀ (type of *rufula*), Minca to Cincinnati, San Lorenzo Mt., Colombia, Dec. 29, J. Bequaert (Cambridge). ♀, Bucay, 1,000 ft., Ecuador, Oct. 4, 1922, F. X. Williams (Cambridge.)

This species ranges from southern Texas to Ecuador.

Subfamily CEROPALINAE

Probably the sharply compressed subgenital plate of the female is the most distinctive recognition mark of the subfamily Ceropalinae, the characters of which are summarized in the key. Most of these characters indicate it a derivative of the same stock as the Psammocharinae and it may well be a polyphyletic offshoot of that group. Probably many years will elapse before it can be shown with satisfaction whether the present limits of the subfamily Ceropalinae is a natural one. The genera included in it here agree in certain morphological characters and have a biological similarity in that they do not store spiders in nests. The Notocyphini and Minageniini, as far as known, oviposit on spiders which continue to be free and active until the growing wasp larva finally kills it. A few Psammocharinae (e. g., *Homonotus*) have somewhat similar habits. The Ceropalini oviposit on the spider prey of other psammocharids and thus live as social parasites. Grouping these three tribes together as a single subfamily emphasizes these similarities and avoids the maintenance of a large number of small subfamilies. It is hoped that this arrangement may prove a useful one.

Key to the tribes of Ceropalinae

1. Nervellus ending at or distad of the juncture of cubitella with discoidella; stigma about 2.5 as long as wide (pl. 1, fig. 12); sting decurved.
 Notocyphini (p. 221)
 Nervellus ending far basad of the juncture of cubitella with discoidella; stigma about 3.5 to 4.5 as long as wide (pl. 1, figs. 13, 14); sting straight 2
2. Inner margins of eyes subparallel, not distinctly emarginate; labrum small, inconspicuously exposed . . . . **Minageniini** (p. 225)
 Inner margins of eyes strongly divergent above, emarginate above the middle; labrum large, conspicuously exposed . . . . **Ceropalini** (p. 237)

Tribe Notocyphini

Labrum large and exposed; eyes subparallel within; flagellum flexible and not unusually thickened; thorax long; propodeum long, at least in the female with a long dorsal face and a well differentiated posterior face; stigma small, about 2.5 as long as wide; nervellus ending at or distad of the juncture of cubitella with discoidella; middle and hind femora often with spinelike bristles set in pits; spinelike bristles on outer apical margin of hind tibia short, regular, closely spaced, and usually forming an uninterrupted row; last segment of tarsi often with a median ventral row of bristles; female subgenital plate compressed, with a median, ventral longitudinal ridge, at least apically; sting decurved.

There are two genera known, the Oriental *Minotocyphus* (=*Sinotocyphus*, new synonymy), and the predominately Neotropic *Notocyphus*. They differ most conspicuously in the shape of the apical margin of the labrum, convexly rounded in *Minotocyphus* and concavely emarginate in *Notocyphus*.

Genus *Notocyphus* Smith

Notocyphus Smith, 1855. Catalogue of the hymenopterous insects in the . . . British Museum, pt. 3, p. 172. Type: *Notocyphus saevissimus* Smith; designated by Smith, 1873.

This is a genus of the Neotropics, with a single polytypic species invading the southwestern portion of the United States. In 1951 (U. S. Dep. Agr., Agr. Monogr. No. 2, p. 920) I considered this species identical with the Mexican *Notocyphus plagiatus* Smith, but notes on the type of *plagiatus* sent to me from the British Museum by Mr. I. Yarrow indicate that it is probably distinct.

Notocyphus dorsalis Cresson

This species is divisible into three subspecies on color characters, as indicated in the key below.

Keys to the subspecies of Notocyphus dorsalis

MALES

1. Forewing entirely fuscous; range: Texas and northeastern and north-central México . . . . **1c. dorsalis dorsalis** Cresson
   Forewing fuscous on its apical third, its basal two-thirds more hyaline (pl. 1, fig. 12) **2**
2. Range: Arizona and southern California
   1b. dorsalis arizonicus, new subspecies
   Range: central México to Guatemala . **1a. dorsalis restrictus,** new subspecies

FEMALES

1. Side of pronotum black; frons orange in the middle, black next to the eyes; range: central México to Guatemala . **1a. dorsalis restrictus,** new subspecies
   Side of pronotum partly orange-red; frons orange **2**
2. Usually less than the lower 0.4 of the side of the pronotum black; range: Arizona and southern California . **1b. dorsalis arizonicus,** new subspecies
   Usually more than the lower 0.4 of the side of the pronotum black; range: Texas and northeastern and north-central México.
   1c. dorsalis dorsalis Cresson

1a. *Notocyphus dorsalis restrictus*, new subspecies

Male: Similar to the male of the subspecies *arizonicus*, but the wings are a little more suffused with blackish.

Female: Forewing 9.5 to 16 mm. long. Black. Mouth parts and antenna more or less tinged with red-brown; head and thorax marked with orange-red as follows: frons except laterally, upper half of posterior orbit narrowly, and a broad median stripe on the top of the thorax extending from the neck either on to the postnotum or to the articulation of the abdomen.

Type: ♀, L. Thiel, Guatemala, 1925, S. Sebastian Retalhulen (Washington).

Paratypes: 3♂, 2♀, Guadalajara, Jalisco, México, July 23 and 24, 1951, P. D. Hurd and H. E. Evans (Berkeley, Evans, and Townes). ♀, México (Washington). ♀, locality illegible, October (Washington).

The series from Guadalajara is somewhat intermediate to the subspecies *dorsalis*.

This subspecies occurs in México and Guatemala.

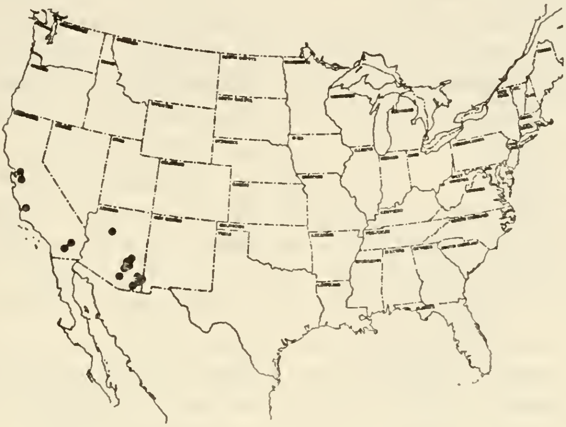


Figure 130.—Localities for *Notocyphus dorsalis arizonicus*.

1b. *Notocyphus dorsalis arizonicus*, new subspecies

Plate 1, figure 12

Male: Forewing 8 to 12 mm. long. Black, marked with white as follows: clypeus laterally, front orbits broadly, posterior orbits narrowly, hind margin of pronotum (reaching the lateral lobes), usually an elongate oval median mark on mesoscutum, disc of scutellum, disc of postscutellum, a pair of transverse oval areas at base of third tergite (usually confluent), and seventh tergite. Palpi more or less whitish; apical third of forewing infuscate, the rest hyaline to more or less infuscate but always paler than on the apical third, the basal vein and nervulus often margined with deeper infuscation; hind wing hyaline or subhyaline, somewhat infuscate apically.

Female: Forewing 11 to 16 mm. long. Black. Mouth parts and antennae more or less tinged with reddish brown; head and thorax marked with orange-red as follows: frons, top of head, posterior orbit, pronotum except its lower 0.3±, mesonotum, metanotum, and propodeum except laterally. Wings uniformly blackish.

Type: ♂, 6 miles west of Douglas on U. S. route 80, Ariz., July 28, 1948, H. E. Evans (Washington, USNM 61799).

Paratypes: 2♀, Baboquivari Mts., July 7, 1924, O. C. Poling (San Francisco). ♀, Douglas, Ariz., June 16, 1942, E. C. Van Dyke (San Francisco). ♂, 2♀, 30 miles and 35 miles northeast of Douglas at

4,650 ft. and at 4,600 ft., Ariz., Aug. 1, 1946, H. A. Scullen (Berkeley and Townes). ♂, Douglas, Ariz., Aug. 20, 1932, W. W. Jones (Washington). ♂, 25 miles northeast of Globe, Ariz., Aug. 9, 1948, H. E. Evans (Evans). ♂, on flowers of *Baccharis glutinosa*, Apache, Ariz., July 27, 1948, H. E. Evans (Evans). 14♂, 3♀, on flowers of *Asclepias* and *Melilotus alba*, same locality, date, and collector as the type (Evans and Townes). ♀, 4 miles north of Drake, Ariz., July 17, F. M. Carpenter (Cambridge). ♀, Oracle Junction, Pinal County, Ariz., July 26, 1948, F. Werner (Cambridge). 2♀, Rio Aravaipa, 2,500 ft., Ariz. (Washington). ♂, Santa Catalina Mts., 5,500 ft., Ariz., July 25, 1917, J. Bequaert (Cambridge). ♀, Tucson, Ariz., Aug. 27, 1938, D. J. and J. N. Knull (Cambridge). 2♀, southern Ariz. (Cambridge). ♀, Arroyo Mocho, 12 miles south of Livermore, Calif., July 18, 1948, Ray F. Smith (Berkeley). ♀, Arroyo Seco, Monterey County, Calif., Aug. 23, 1949, C. D. MacNeill (Berkeley). ♀, Morongo, Calif., Sept. 18, Cockerell (Cambridge). 2♀, Mount Diablo, Calif., July to August, 1941 (Berkeley). ♀, Palm Springs, Riverside County, Calif., J. D. Gunder (Townes). ♀, Temecula, Riverside County, Calif., July 4, 1950, J. W. MacSwain (Berkeley).

This subspecies occurs in the Lower Sonoran fauna of Arizona and California. Most adults have been collected in July and August.

1c. *Notocyphus dorsalis dorsalis* Cresson

Notocyphus dorsalis Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 207, ♀ Lectotype: ♀, Texas (Philadelphia).

Notocyphus texanus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 207, ♂. Lectotype: ♂, Texas (Philadelphia).

MALE: Forewing 9 to 17 mm. long. Black, marked with white as follows: sometimes a lateral pair of oval blotches on the clypeus, front orbits, posterior orbits more narrowly, hind margin of pronotum (not reaching the lateral lobes), often a small spot on scutellum, a pair of transverse oval areas at base of third tergite (often more or less confluent), and seventh tergite. Palpi light brown; both pairs of wings uniformly blackish.

FEMALE: Forewing 12 to 18 mm. long. Black. Mouth parts and antenna more or less tinged with red-brown; head and thorax marked with orange-red as follows: frons, top of head, posterior orbit, pronotum except on its lower 0.5±, mesonotum, metanotum, and propodeum except laterally. Wings uniformly blackish.

SPECIMENS: ♀, Alpine, Tex., June 4, 1927 (Washington). 4♀, Bexar County, Tex., Sept. 10 and 19, 1931, and Oct. 27, 1935, H. B. Parks (College Station, Tex. and Townes). ♂, Fedor, Tex., May 16 (Cambridge). ♀, Pleasanton, Tex., Oct. 12, 1936 (Krombein). ♀, Valentine, Tex., July 18, 1917 (Cambridge). ♀, Valentine, Tex., July 13, 1927, L. A. Anderson (Lawrence). ♀, Williamson County, Tex., Sept. 8, 1934, J. E. Gillaspy (College Station, Tex.). 4♂, 2♀, on *Baccharis salicina*, Williamson County, Tex., Oct. 5, 1935, J. E. Gillaspy (Strandtmann, Townes, and College Station, Tex.). ♂ (type of *texanus*), ♀ (type of *dorsalis*), Texas (Philadelphia). 2♂ (paratypes of *texanus*), 2♀ (paratypes of *dorsalis*), Texas (Washington). ♀, no data (Cambridge). ♂, on *Asclepias*, 8 miles south of Camargo, Chihuahua, México, Aug. 10, 1951, H. E. Evans (Evans). ♂, 6♀, on *Baccharis*, vicinity of Chihuahua (city), Chihuahua, México, Aug. 11 and 12, 1951, H. E. Evans and P. D. Hurd (Evans, Berkeley, and Townes). 3♂, 3♀, on flowers of *Guardiola tulocarpa*, 8 miles south of Canutillo, Durango, México, Aug. 9, 1951, P. D. Hurd and H. E. Evans (Berkeley and Evans). 4♂, 2♀, Nombre de Dios, Durango, México, Aug. 1 and 6, 1951, P. D. Hurd (Berkeley and Townes). Cresson states that the types of both *texanus* and *dorsalis* were taken on *Solidago* in September and October.

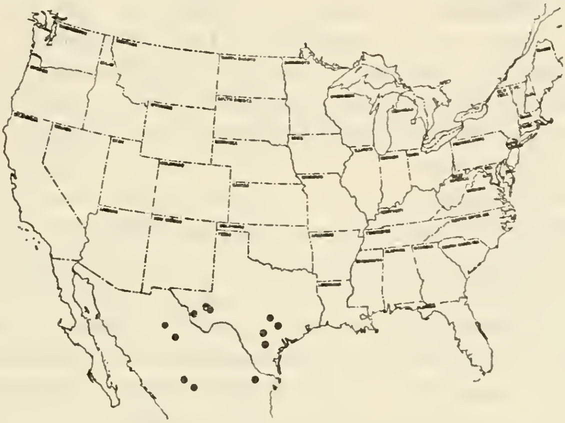


Figure 131.—Localities for *Notocyphus dorsalis dorsalis*.

Some of the specimens here reported from various localities in México tend in the direction of the other two subspecies, but are closer to typical *dorsalis* than to the norm of the subspecies *arizonicus* or *restrictus*.

This subspecies is known from Texas and the adjacent parts of México. Adults occur from June to October.

Tribe Minageniini

Labrum short, briefly exposed; eyes subparallel within; thorax rather short; flagellum flexible and not unusually thickened; propodeum rather short, weakly convex in profile; stigma moderate in size, about 3.5 as long as wide; nervellus ending distinctly basad of the juncture of cubitella with discoidella (pl. 1, fig. 13); middle and hind femora without spinelike bristles set in pits; spinelike bristles on outer apical margin of hind tibia rather weak, forming an irregular or interrupted row; last segment of tarsi without distinct preapical spinelike bristles; female subgenital plate strongly compressed, at the apex with a brief, ventral, longitudinal ridge; sting straight, strong.

There is a single, widely distributed genus.

Genus *Minagenia* Banks

Minagenia Banks, 1934, Proc. Amer. Acad. Arts. Sci., vol. 69, pp. 40, 64. Type: *Pseudagenia* (*Minagenia*) *brevicornis* Banks; original designation.

Nannochilus Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, p. 171. Type: *Pseudagenia externa* Banks; original designation.

Minagenia probably has a wide distribution, but seems to be rare outside of the Western Hemisphere. Besides the genotype from the Philippines, I have seen a paratype of the Madagascan *Micragenia minima* Banks 1941, which is referable to *Minagenia* (new combination). The Neotropic species of which I have seen the types are *Pompilus levipes* Cresson 1869, *Nannochilus obscurus* Banks 1946, *N. peruanus* Banks 1946, *N. laevis* Banks 1946, and *Minagenia minor* Dreisbach 1953 (all but *M. minor* are new combinations in *Minagenia*).

The Neartic species have a close structural similarity and a variable coloration. They are best distinguished by the male genitalia. These structures, however, are variable within a species, so that a series is needed for understanding the basic specific patterns. The females belonging with the males have been identified with certainty in some cases, in other cases with doubt or not at all. In the treatment below females are included only in those cases where correlations with the males are certain or probable.

What little is known about the biology of *Minagenia* indicates that the larva lives as an external parasite on the abdomen of an active spider, somewhat like the polysphinctine ichneumonids. The cocoon apparently is spun under bark or in similar places, probably wherever the spider succumbs.

Keys to the Nearctic Species of Minagenia

MALES

(The male of *externa* is unknown.)

1. Subgenital plate with a sharp median longitudinal ridge, the plate sharply folded longitudinally; clypeus, abdomen, and femora black; genitalia as in plate 4, figure 48 . . . . 9. **montisdorsa** Dreisbach
   Subgenital plate without a median longitudinal ridge, flat or having the sides uncurved (pl. 4, figs. 45, 46, 47); clypeus, abdomen, or femora often pale . . . 2
2. Second to fifth sternites with numerous suberect long hairs; apical part of paramere very slender but without unusually long bristles (pl. 3, fig. 38).
   6. **osoria** (Banks)
   Second to fifth sternites with a few oblique long hairs or without unusually long hairs; apical part of paramere not unusually slender, or, if unusually slender, then with unusually long bristles 3

3. Clypeus blackish except in occasional specimens of *julia* 4
   Clypeus partly or entirely stramineous. 5
4. Hind femur black; forewing 5.7 to 7.8 mm. long; paramere with numerous oblique bristles on both sides (pl. 3, fig. 35) . . . . 1. **congrua** (Cresson)
   Hind femur partly or entirely rufous; forewing 4.2 to 6.0 mm. long; paramere with sparse divergent bristles on the outer side and now or almost none on the inner side (pl. 4, figs. 41, 42, 43). . . . . 7. **julia** (Brimley)
5. Abdomen and middle and hind femora black or blackish; genitalia as in plate 3, figure 37 . . . . 4. **clypeata** (Banks)
   Abdomen and middle and hind femora partly or entirely rufous. 6
6. Subgenital plate pointed apically; hind coxa blackish; forewing 7.8 mm. long . . . . 2. **major,** new species
   Subgenital plate truncate apically; hind coxa mostly rufous; forewing 5.2 to 6.0 mm. long . . . . 3. **lata,** new species
   8. **perfecta** (Provancher)

FEMALES

(Females of *lata, osoria* and *perfecta* are unknown; those of *clypeata* and *major* are not known with certainty.)

1. Abdomen rufous 2
   Abdomen black or mostly blackish 4
2. Hind femur black; forewing 7.0 to 7.7 mm. long; bristles on subgenital plate moderately stout . . . . 1. **congrua** (Cresson)
   Hind femur rufous or mostly rufous; forewing 4.8 to 8.0 mm. long. 3
3. Front and middle femora black; forewing 8.0 mm. long; bristles on subgenital plate stout and stubby. . . . . ? 2. **major,** new species
   Front and middle femora rufous; forewing 4.8 to 6.3 mm. long; bristles on subgenital plate slender and tapered . . . . 7. **julia** (Brimley)
4. Hind femur rufous; abdomen partly rufous. . . . . 5. **externa** (Banks)
   Hind femur black; abdomen entirely black or blackish. 5
5. Forewing weakly infuscate, with a subapical darker area; bristles on subgenital plate mostly along the ventral edge. . . . . ? 4. **clypeata** (Banks)
   Forewing uniformly, moderately infuscate; bristles on subgenital plate rather scattered. . . . . 9. **montisdorsa** Dreisbach

1. *Minagenia congrua* (Cresson)

PLATES 3, FIGURE 35; and 4, FIGURE 46

Pompilus (*Agenia*) *congruus* Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 129, ♀. Type: ♀, West Virginia (Philadelphia).

Agenia rufigastra Provancher, 1889, Additions et corrections au volume II de la faune entomologique du Faune Canada traitent des Hyménoptères, p. 264, ♀. Type: ♀, Hull, Quebec (Quebec).

Minagenia semirufa Dresibach, 1953, Amer. Midl. Nat., vol. 49, p. 841, ♂ (new synonymy). Type: ♀. Petersham, Mass. (Cambridge).

? *Minagenia michiganensis* Dreisbach, 1953, Amer. Midl. Nat., vol. 49, p. 842, ♂ (new synonymy). Type: ♂, Roscommon County, Mich. (Cambridge).

MALE: Forewing 5.7 to 7.8 mm. long; sternites 2 to 5 with a few inconspicuous oblique hairs that are about 3 times as long as the ordinary clothing hairs; subgenital plate oblanceolate with a rounded apical point, the edges curled upward so that it looks quite narrow;

squama elongate lanceolate, with a dense fringe of long oblique bristles on both margins.

Black. Labrum and mandible except basally reddish brown; under edge of scape, palpi and front tibia brown; tibial spurs pale brown; front tarsus brown; wings faintly tinged with brown; abdominal segments 1 and 2 and sometimes the basal part of 3 rufous, the other tergites and sternites often margined with a rufous tinge.

Female: Forewing 7.0 to 7.7 mm. long; sensillae beginning at basal 0.35 of second flagellar segment; subgenital plate ventrally with a longitudinal band of suberect stout hairs of rather uniform length and about 0.5 as long as and much stouter than some scattered long hairs.

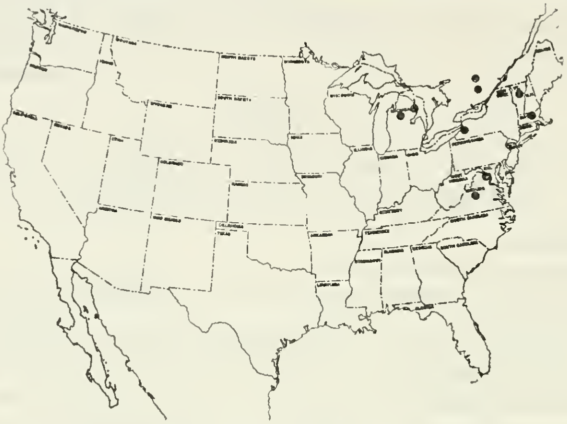


Figure 132.—Localities for *Minagenia congrua*.

Black. Labrum and apical part of mandible reddish brown; palpi, front tibia, and tibial spurs brown; front tarsus dark brown; wings tinged with brown; abdomen rufous, blackish at the base of the first segment.

The type of *michiganensis* agrees externally with *congrua* as decribed here but the squama is less elongate and attenuate apically, and the subgenital plate broader. It may be an aberrant specimen of the present species, but any decision as to its disposition is tentative until better series are available for study.

Specimens: ♂ (type of *semirufa*), Petersham, Mass., July 1940, C. T. Brues (Cambridge). ♀, Alcona County, Mich., July 19 to 24, 1937, H. S. Telford (St. Paul). ♂ (type of *michiganensis*), Roscommon County, Mich., July 14, 1948, R. R. Dreisbach (Dreisbach). ♂, East Aurora, N. Y., July 18, 1909, M. C. VanDuzee (Cambridge). ♂, Charter Oak, Pa., June 19, 1918, H. B. Kirk (Cambridge). ♀, Gracefield, Quebec, June 24, 1937, O. Peck (Ottawa). ♀ (type of *rufigastra*), Hull, Quebec (Quebec). ♂, Plainfield, Vt., July 20 to 24, 1941, R. H. McCauley (Townes). ♀, in woods, Dunn Loring (near Vienna), Va., Aug. 22, 1948, K. V. Krombein (Krombein). ♀, Skyline Drive, Va., Aug. 4, 1945, H. and M. Townes (Townes). ♀ (type of *congrua*), West Virginia (Philadelphia).

This species belongs to the Alleghenian fauna and is the most northern in distribution of the Nearctic species.

2. *Minagenia major*, new species

MALE: Forewing 7.8 mm. long; second to fifth sternite with a few suberect longer hairs that are about 2.5 as long as the ordinary clothing hairs; subgenital plate oblanceolate with a rounded apical point, the edges somewhat curled upward; squama sublinear, with a pointed apex and with a fringe of long oblique bristles which is more copious on the outer side than on the inner.

Black. Clypeus, labrum, mandible except at the base and apex, palpi except basally, underside of scape, collar of pronotum, front coxa except above, front trochanter except basally, front tibia, basal four segments of front tarsus, all tibial spurs, and underside of middle coxa, stramineous; tegula brown; middle and hind femora and lateral blotches on first two abdominal segments rufous, the femora somewhat infuscate basally; middle tibia fulvous, infuscate behind; wings subhyaline.

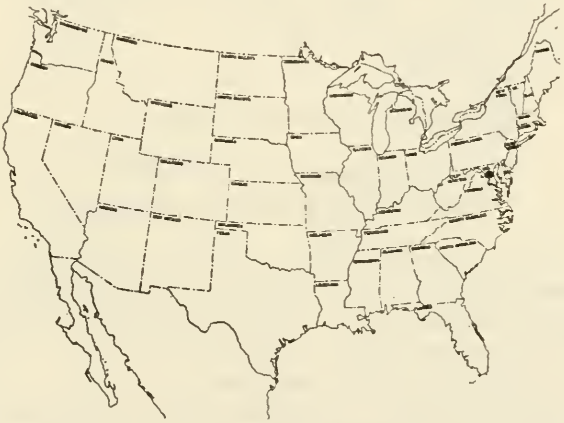


FIGURE 133.—Locality for *Minagenia major*.

FEMALE: Forewing 8.0 mm. long; sensillae beginning at apical 0.2 of second flagellar segment; subgenital plate ventrally with a longitudinal band of suberect, stout, abruptly pointed hairs of uniform length and about 0.4 as long as and much stouter than some scattered long hairs.

Black. Labrum and apical part of mandible reddish brown; palpi and front tibia and tarsus dark brown; apices of front and middle femora tinged with rufous; hind femur rufous, its basal 0.3

somewhat infuscate; tibial spurs stramineous; wings somewhat infuscate; abdomen rufous, blackish at the base of the first segment.

The association of the above female with the male seems plausible, but not certain.

Type: ♂, Washington, D. C., Sept. 9, 1947, D. Shappirio (Washington, USNM 61709).

Paratype: ♀, Sitton's Gulch, Ga., July 16, 1936, P. W. Fattig (Townes).

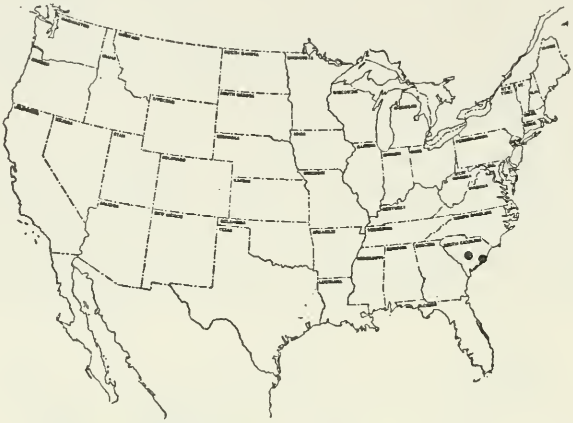


Figure 134.—Localities for *Minagenia lata.*

3. *Minagenia lata*, new species

Plates 3, figure 36; and 4, figure 44

Male: Forewing 5.2 to 6.0 mm. long; second to fifth sternites with a few, inconspicuous, oblique, longer hairs that are about 1.7 as long as the ordinary clothing hairs; subgenital plate obovate, without an apical point, rather flat; squama long spatulate with a fringe of long, dense, oblique bristles on both margins.

Black. Clypeus, labrum, mandible except at the base and apex, palpi except basally, a tinge on ventral edge of scape, collar and lower corner of pronotum, front coxa except basally, underside of middle coxa, and tibial spurs, stramineous; tegula, most of legs, and basal two abdominal segments rufous, the rest of the abdomen with some rufous tinges and the legs marked with fuscous as follows: front coxa basally, middle and hind coxae basally above, bases of trochanters, middle tibia except below, hind tibia except for a central rufous tinge, and middle and hind tarsi; wings subhyaline.

Female: Unknown.

Type: ♂, McClellanville, S. C., May 20, 1944, H. K. Townes (Townes).

Paratype: ♂, Columbia, S. C., July 22, 1951, G. F. Townes (Townes).

4. *Minagenia clypeata* (Banks)

PLATES 1, FIGURE 13; and 3, FIGURE 37

Ageniella clypeata Banks, 1914, Journ. New York Ent. Soc., vol. 22, p. 306, ♂. Type: ♂, Chain Bridge, Va. (Cambridge).

Minagenia shappirioi Dreisbach, 1953, Amer. Midl. Nat., vol. 49, p. 839, ♂ (new synonymy). Type: ♂, Osceola County, Mich. (Cambridge).

MALE: Forewing 6.0 to 7.2 mm. long; sternites 2 to 5 with some long oblique or sometimes suberect hairs that are about 2.5 as long as the ordinary clothing hairs, the longer of these hairs more nearly erect and bent at the apex; subgenital plate broadly oblanceolate with a blunt point, but the sides curved upward so that it appears rather narrowly lanceolate; squama long spatulate, with a fringe of dense, long, oblique bristles on both margins.

Black. Clypeus partly or entirely, labrum, mandible except at the base and apex, palpi except basally, ridge on underside of scape, underside of fore and middle coxae, tibial spurs, and pronotal collar, stramineous; fore legs dark brown basally, grading to pale brown on the tarsi, the apical tarsal segment darker; tegula and sometimes lateral tinges on abdomen dusky rufous; wings subhyaline, faintly infuscate apically.

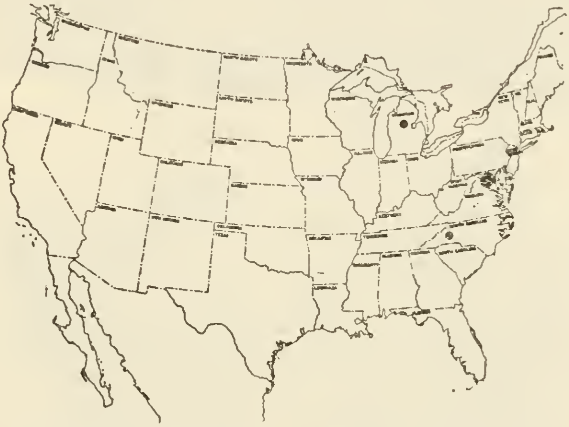


FIGURE 135.—Localities for *Minagenia clypeata*.

FEMALE: The presumed female of this species has the forewing 5.7 to 7.5 mm. long; sensillae beginning as a few scattered ones on the apical 0.5 of the second flagellar segment, more closely spaced on the third and following segments; and subgenital plate ventrally with a longitudinal band of suberect stout hairs of rather irregular length and diameter but stouter and shorter than some scattered long hairs.

Black. Tibial spurs and front of front tibia brown; wings weakly infuscate, the forewing with a darker subapical area starting at the level of the stigma, its apical edge also a little darker than the rest.

This female was collected in several localities with the male *clypeata*, but also in some areas with the male *osoria*. It seems more likely that it belongs with *clypeata*, but there is a possibility that the association is mistaken or that the females of both species are confused in the series.

SPECIMENS: ♀, Washington, D. C., Sept. 5, 1947, M. Vogel (Vogel). ♀ and gynandromorph, Cabin John, Md., July 15 and Sept. 29, 1917, R. M. Fouts (Washington). ♀, Glen Echo, Md., Aug. 12, 1917, R. M. Fouts (Washington). ♀, Takoma Park, Md., Sept. 9, 1945, H. and M. Townes (Townes). ♂ (type of *shappirioi*), Osceola County, Mich., Aug. 3, 1940, R. R. Dreisbach (Cambridge). 5 ♀, taken on oak foliage in small clearing in woods, Hamrick, N. C., Aug. 17, 19, and 29, 1950, H., M., and D. Townes (Townes). ♂ (type of *clypeata*), Chain Bridge (near Washington, D. C.), Va. (Cambridge). ♂, 2 ♀, Dunn Loring (near Vienna), Va., Aug. 21, 1949, Aug. 22, 1948, and Sept. 11, 1948, K. V. Krombein (Krombein). 2 ♂, 1 ♀, Falls Church, Va., June 27, Aug. 9, and Sept. 18, N. Banks (Cambridge). 3 ♂, Great Falls, Va., July 8 and Aug. 13, N. Banks (Cambridge).

This species has been taken only in the vicinity of Washington, D. C., in the mountains of western North Carolina, and in Michigan. The flight period is from June 27 to Sept. 29.

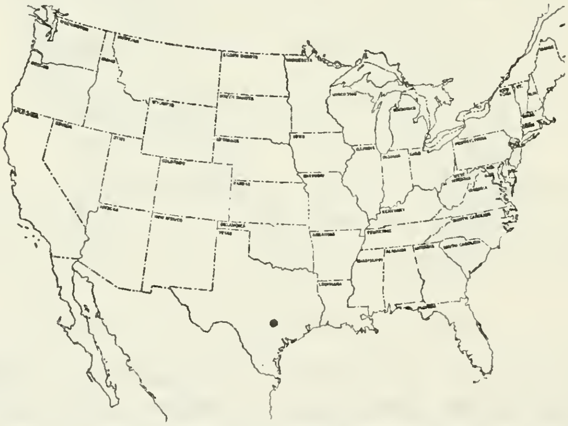


FIGURE 136.—Locality for *Minagenia externa*.

5. *Minagenia externa* (Banks)

Pseudagenia externa Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 124, ♀. Type: ♀, Fedor, Lee County, Tex. (Cambridge).

MALE: Unknown.

FEMALE: Structurally similar to *M. montisdorsa* but differing in color as follows: under side of flagellum tinged with fulvous; tegula dusky fulvous; legs fulvous except that the upper side of the coxae is infuscate, fore trochanter basally and middle and hind trochanters above weakly infuscate, underside of front femur, outer side of all tibiae, and hind tarsus fuscous, and hind tibia with a board, ill-defined, fuscous subbasal band; tergites tinged with fulvous apically; first and second tergites each with a lateral fulvous blotch.

Specimen: ♀ (type), Fedor, Lee County, Tex. (Cambridge).

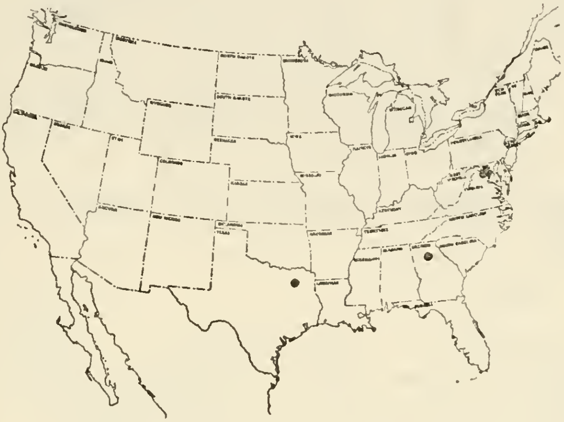


Figure 137.—Localities for *Minagenia osoria.*

6. *Minagenia osoria* (Banks)

Plates 3, figure 38; and 4, figure 45

Nannochilus osoria (as *Ageniella osoria*, p. 178) Banks, 1944, Bull. Mus. Comp. Zool., vol. 94, pp. 172, 178, ♂. Type: ♂, Falls Church, Va. (Cambridge).

Male: Forewing 5.5 to 6.2 mm. long; sternites 2 to 5 with numerous long suberect hairs that are about 3.0 as long as the ordinary clothing hairs, the tips of the long hairs bent; subgenital plate oblanceolate with a rounded apical point, the edges curled up so that it looks quite narrow; squama apically very slender, with sparse, oblique, rather short bristles near its apex and along its outer edge.

Color variable but usually as described here. Black. Apical part of mandible reddish brown; labrum, tibial spurs, and front tarsus stramineous, the apical tarsal segment dark brown; palpi brown, darker basally; knees and apex of front tibia brownish; wings subhyaline. Variant colorations include a pale stramineous brown clypeus, palpi, most of scape, and hind margin of side part of pronotum; light rufous legs, tegula, and basal 0.6 of abdomen; and brown hind tibia and middle and hind tarsi. Intermediates between the dark and light types of coloration are at hand.

Female: Unknown, though possibly confused with females of *clypeata* or *julia.*

Specimens: ♂, Washington, D. C., May 16, 1949 (Shappirio). ♂, Takoma Park, Md., July 12, 1947, D. Shappirio (Shappirio).

♂, Takoma Park, Md., Sept. 5, 1942, H. and M. Townes (Townes). ♂, emerged May 12, 1939, from dense, oval cocoon found under bark on Apr. 22, 1939, Hunt County, Tex., R. W. Strandtmann (Strandtmann). ♂, reared from larva on the body of a young lycosid spider, found May 14, 1945, at Gainesville, Ga., spun a cocoon May 16, 1945, pupated May 18, 1945, and emerged as an adult June 9, 1945, B. J. Kaston (Kaston). Another larva, possibly of this species, was found on the body of a young lycosid spider by B. J. Kaston at Gainesville, Ga., Sept. 19, 1940; the larva moulted Dec. 19, 1940, and Dec. 31, 1940; spun a cocoon Jan. 2, 1941; but failed to emerge as an adult (Kaston). ♂ (type), Falls Church, Va., July 12, N. Banks (Cambridge).

This species appears to belong to the Carolinian and Austroriparian faunas.

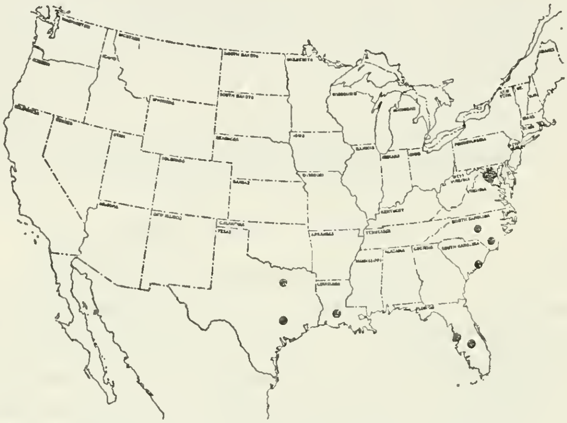


Figure 138.—Localities for *Minagenia julia.*

7. *Minagenia julia* (Brimley)

Plate 4, figures 41, 42, 43, 47

Ageniella julia Brimley, 1934, Ent. News, vol. 45, p. 42, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

Male: Forewing 4.2 to 6.0 mm. long; sternites 2 to 5 with very short clothing hairs, and a few oblique hairs a little longer than the rest; subgenital plate rather narrowly oblanceolate, its apical point rounded and its sides upcurved; squama linear, elongate or short, with a fringe of very long suberect bristles on the outer side.

Color variable, usually as described here. Black. Under edge of scape, labrum, and apical part of mandible light brown; palpi and tegula brown; legs rufous, the fore coxa basally behind, a longitudinal stripe on middle and hind coxae, front tarsus apically, middle and hind tarsi, middle tibia apically, and most of hind tibia, infuscate;

tibial spurs infuscate; wings subhyaline; abdomen rufous basally, blackish apically. Although most specimens are of the foregoing coloration, occasional ones have the legs and abdomen almost entirely blackish with the front tarsus and tibial spurs pale brown, the front tibia largely brown, and tinges of rufous on the sides of the abdomen. Specimens of intermediate coloration are common.

FEMALE: Forewing 4.8 to 6.3 mm. long; sensillae beginning as a few scattered ones on apical 0.3 of second flagellar segment; subgenital plate with a median longitudinal broad area of long, fine, suberect hairs that are weaker than in the other Nearctic species.

Black. Scape and apical part of mandible tinged with reddish brown; palpi brown; tegula reddish brown; legs rufous, the coxae at the extreme base and the hind tarsus fuscous; apices of middle and hind tibiae and of front and middle tarsi infuscate; wings suffused with light brown, the forewing with a faintly darker cloud centering just beyond the stigma; abdomen rufous, blackish at the base of the first segment.

Seven females at hand have the coxae and trochanters mostly or entirely blackish and often some basal infuscations on the femora. They may be variants of *julia* or represent a distinct species.

SPECIMENS: ♂, Washington, D. C., July 7, 1947, R. Boettcher (Vogel). ♂, 4♀, Washington, D. C., Sept. 4, 1947, M. Vogel (Vogel and Townes). ♀, Washington, D. C., Sept. 9, 1947, D. Shappirio (Shappirio). ♂, Washington, D. C., Sept. 11, 1947, M. Vogel (Shappirio). ♂, Lake Placid, Fla., Apr. 1, 1954, K. V. Krombein (Krombein). 2♀, Tarpon Springs, Fla., Mar. 20 and 21, 1950, H. Townes (Townes). ♂, Louisiana (Washington). ♂, Opelousas, La., G. R. Pilate (Washington). 2♂, Plummers Island, Md., July 3, 1921 (Cambridge). ♀, Garland, N. C., Sept. 30, 1951, H. and M. Townes (Townes). ♂ (type), Raleigh, N. C. (Raleigh). ♀, Wake County, N. C., June 2, 1949, H. Townes (Townes). 3♂, McClellanville, S. C., May 10 and 17, 1944, H. Townes (Townes). ♂, Brazos County, Tex., Apr. 30, 1939, J. E. Gillaspy (College Station, Tex.). ♂, ♀, Roanoke in Denton County, Tex., May 31, 1951, H. E. Evans (Evans). ♂, Dunn Loring (near Vienna), Va., July 13, 1947, K. V. Krombein (Krombein). 2♂, Falls Church, Va., July 4, N. Banks (Cambridge). ♂, Great Falls, Va., July 15, N. Banks (Cambridge).

This species occurs in the Carolinian and Austroriparian faunas. Adults occur from midspring to early fall.

8. *Minagenia perfecta* (Provancher), new combination

Agenia perfecta Provancher, 1882, Naturaliste Canadien, vol. 13, p. 44, ♂. Type: ♂, Cap Rouge, Quebec (Quebec).

The type has recently been examined by K. V. Krombein who reports that it represents a species of *Minagenia* which will key to

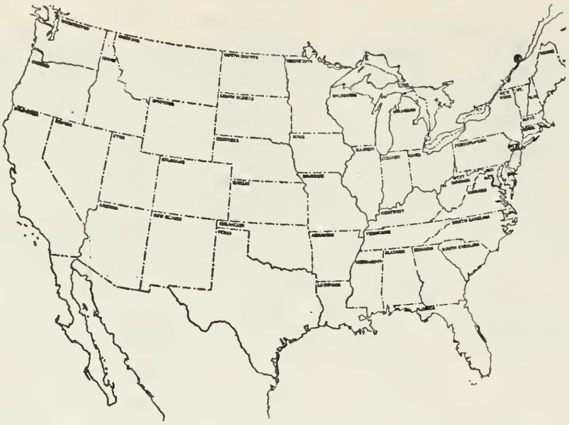


FIGURE 139.—Locality for *Minagenia perfecta.*

M. lata in the key published herein. His further notes on the type state that the sixth sternite has a median, polished, slightly raised oval area and the hooks invisible; subgenital plate flat, truncate at the apex, the surface with moderately dense, decumbent setae; hind margin of pronotum V-shaped; hind coxae reddish beneath, the trochanters and femora entirely reddish.

I am unable to recognize this species among those at hand.

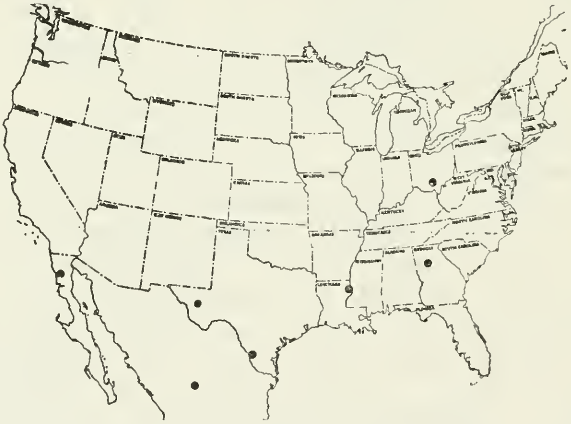


FIGURE 140.—Localities for *Minagenia montisdorsa.*

9. *Minagenia montisdorsa* Dreisbach

PLATES 3, FIGURES 39, 40; AND 4, FIGURE 48

Minagenia montisdorsa Dreisbach, 1953, Amer. Midl. Nat., vol. 49, p. 840, ♂. Type: ♂, Ross County, Ohio (Columbus).

MALE: Forewing 5.2 to 6.7 mm. long; punctures on frons and thorax a little coarser than in the other Nearctic species of the genus; sternites

2 to 5 with very short clothing hairs, and a few oblique hairs a little longer than the rest; subgenital plate broadly lanceolate and with a pointed apex, but sharply folded along the midline so as to appear narrow from below and lanceolate from the side; squama usually linear spatulate but sometimes short spatulate, with its apical part a little broadened, covered with long oblique hairs, and its end rounded.

Black. Front tibia and tarsus more or less brownish; tibial spurs stramineous, infuscate basally; wings subhyaline, the forewing with a weak infuscation along its apical margin.

Female: Forewing 6.7 mm. long; punctures on frons and thorax a little coarser than in other Nearctic species of the genus; sensillae beginning near the middle of the second flagellar segment; subgenital plate with the long suberect hairs rather scattered, but somewhat concentrated medially. These longer hairs arise from more definite punctures than in other Nearctic species of the genus. The median hairs are mostly rather stout but tapered to a slender tip.

Black. Apical part of mandible reddish brown; tibial spurs brown; wings somewhat infuscate, paler basally.

Specimens: ♂, Atlanta, Ga., July 27, 1942, P. W. Fattig (Cambridge). ♂, Tallulah, La., Aug. 1940, J. E. Gillaspy (Townes). ♂ (type), Ross County, Ohio, July 9, 1942, D. J. Borror (Columbus). ♂, 10 miles west of Fort Davis, Tex., July 23, 1947, E. D. Valentine (Evans). ♂, ♀, Laredo, Tex., Sept. 24, 1947, J. E. Gillaspy (Evans and Townes). ♂, San Domingo, Baja California, México, July 19, 1948, Michelbacher and Ross (San Francisco). 4♂, 1♀, 15 km. east of Sombrerete, Zacatecas, México, July 28 to 31, 1951, H. E. Evans (Evans, Berkley, and Townes).

This species may prove to be transcontinental in the Lower Austral Zone.

Tribe Ceropalini

Labrum large, conspicuously exposed; eyes divergent dorsally, their inner margins concave above; flagellum rather inflexible and thickened; thorax rather short, the propodeum short and rather flat in profile; stigma about 4.0 as long as wide; nervellus ending distinctly basad of the juncture of cubitella with discoidella (pl. 1, fig. 14); middle and hind femora often with a few spinelike bristles set in pits; spinelike bristles on outer apical margin of hind tibia moderately weak, somewhat irregular in length, forming an irregular or interrupted row; last segment of tarsi often with preapical spinelike bristles that are arranged in two irregular, ventral, sublateral rows; female subgenital plate strongly compressed, in side view somewhat produced apically, with a brief median ventral longitudinal ridge at the apex; sting straight, strong.

Three genera are known: the Oriental *Xanthampulex,* the Neotropic *Irenangelus*, and the worldwide *Ceropales*. A number of features distinguish *Ceropales* from the other Holarctic Psammocharidae, and for this reason there has been a tendency to differentiate this genus sharply from the rest of the family, sometimes even to consider it as a separate family. However, it seems certain that *Xanthampulex* and *Irenangelus* are very close to *Ceropales*, and if the characters of this natural group of genera is considered, rather than of *Ceropales* alone, there seems less justification for the traditional separation. The widespread opinion that the male genitalia of *Ceropales* are distinctive enough to justify family rank shows lack of familiarity with the range of variation of these structures within *Ceropales* and of the conditions in *Xanthampulex* and *Irenangelus*.

The members of the Ceropalini are social parasites on other psammocharids. The female parasite oviposits into a book lung of the spider prey of the host, while it is left unguarded for a moment some time after capture. After the spider is placed in a nest by the host, the ceropaline egg hatches, and the resulting larva consumes the host egg and then the spider. The female parasites have sometimes been seen trailing females of prospective hosts, to be on hand when a spider is captured.

Genus *Ceropales* Latreille

Ceropales Latreille, 1796, Précis des caractères génériques des insectes disposés dans un ordre naturel, p. 123. Type: *Evania maculata* Fabricius; designated by Curtis, 1839.

Ceratopales Schulz, 1906, Spolia hymenopterologica, p. 174 (emendation).

Agenioxenus Ashmead, 1902, Canadian Ent., vol. 34, p. 137. Type: (*Ceropales rufiventris* Walsh) = *robinsonii* Cresson; original designation.

Hypsiceraeus Morice and Durant, 1915, Trans. Ent. Soc. London, pp. 403, 405. Type: *Evania maculata* Fabricius; original designation.

This is the only genus of the Ceropalini occurring in the Nearctic region. It may be distinguished from nearly all other psammocharid genera by the fact that the hind tarsal claws are bent at the middle in a sharp right angle.

The Western Hemisphere species of *Ceropales* divide easily into four species groups as indicated in the keys and descriptions below. Very few Eastern Hemisphere species have been available for study but it seems that most of them belong in groups different from those defined for our fauna.

Key to the Nearctic species of Ceropales

1. Both claws of middle tarsus and hind claw of fore tarsus with a short erect acute subapical tooth, or, in males of the *fulvipes* group, these claws specialized and unlike one another and the second segment of the middle tarsus not distinctly longer than wide 2

Both claws of middle tarsus and hind claw of fore tarsus with a long, appressed, obliquely truncate tooth; second segment of middle tarsus distinctly longer than wide 9

2. Frons opaque, with dense small punctures and without noticeable larger punctures; male with second to fourth segments of fore and middle tarsi not unusually short (second segment of middle tarsus about 2.0 as long as wide); claws of middle tarsus of male symmetric, not specialized; hind femur dark or fulvous, usually with the apex yellow. MACULATA GROUP (SUBSPECIES OF MACULATA) 3

Frons subshining, with minute punctures and also with scattered larger punctures; male with second to fourth segments of fore and middle tarsi very short and broad (second segment of middle tarsus about 1.0 as long as wide); claws of middle tarsus of male asymmetric, specialized; hind femur fulvous. FULVIPES GROUP 7

3. Third tergite entirely blackish 4

Third tergite with an apical yellow or whitish band 5

4. Femora fulvous, often infuscate at the base and apex; range: Europe. 1a. **maculata maculata** (Fabricius)

Femora blackish, in the male with the apex yellow; range: Sierra Nevada of California . . . . 1b. **maculata caenosa**, new subspecies

5. Apical yellow mark on hind femur occupying more than the apical third, at least as disconnected spots; face of female entirely yellow; yellow apical bands of tergites broad; range: much of the Pacific States. 1e. **maculata stretchii** Fox

Apical yellow mark on hind femur occupying less than the apical third, or absent; face of female with a median black area; yellow apical bands of tergites relatively narrow 6

6. Front face of hind femur clear rufous, infuscate basally and usually with a yellow apical spot; range: Minnesota and Manitoba to Alberta, sporadically east to Massachusetts . . 1c. **maculata rhodomerus**, new subspecies

Front face of hind femur mostly brownish or blackish; range: most of the Nearctic Region . . . . 1d. **maculata fraterna** Smith

7. Larger punctures on frons small and weak, separated from one another by an average of about 4.0 their diameter; larger punctures on mesoscutum separated from one another by an average of about 1.5 their diameter; male hind coxa with a basal ventral strongly projecting flange that subtends a strongly excavated portion of the coxa; male subgenital plate produced and in profile swollen apically . . . . 14. **fulvipes** Cresson

Larger punctures on frons of moderate size, separated from one another by an average of about 2.0 their diameter; larger punctures on mesoscutum separated from one another by an average of about 0.7 their diameter; male hind coxa unspecialized or with an internal overhanging ridge on its basal half; male subgenital plate triangular in profile, not so swollen apically 8

8. Front and middle femora rufous with yellow markings; male hind coxa not specialized; male subgenital plate in profile not swollen apically; labrum of female entirely or mostly yellow . . . . 12. **brevicornis** Patton

Front and middle femora blackish or dark brown, with yellow markings; male hind coxa with an internal overhanging ridge on its basal half; male subgenital plate triangular, in profile somewhat swollen apically; labrum of female black . . . . 13. **neomexicana** Rohwer

9. Mesoscutum and top of pronotum with short inconspicuous hairs; second flagellar segment 1.8 to 2.2 as long as wide; female subgenital plate in profile with a projecting apical part, apex of which is evenly rounded; forewing 5.5 to 16 mm. long. ROBINSONII GROUP 10

Mesoscutum and top of pronotum with long, conspicuous, reclined hairs; second flagellar segment 1.2 to 1.6 as long as wide; female subgenital plate in profile rather triangular, with a pointed apex; forewing 2.5 to 5.7 mm. long. FEMORALIS GROUP 20

10. Mesopleuron impunctate; abdomen rufous, sometimes with yellow markings; head and thorax mostly black; wings dark brown, or in some males subhyaline. SUBSPECIES OF ROBINSONII 11
    Mesopleuron with numerous coarse punctures 12
11. Flagellum blackish, often tinged with rufous; abdomen with little or no yellow marking; range: New Hampshire and Illinois to Florida.
    4a. **robinsonii robinsonii** Cresson
    Flagellum rufous, blackish apically; abdomen with yellow marking; range: Kansas and Texas . . . . 4b. **robinsonii stigmatica** Banks
12. Flagellum rufous, blackish at the apex; wings pale to dark brown; abdomen usually mostly rufous. SUBSPECIES OF ELEGANS 13
    Flagellum blackish; wings black or subhyaline; abdomen variously colored . 15
13. Wings dark brown; range: Carolinian and Austroriparian faunas.
    5c. **elegans quaintancei** Viereck
    Wings pale brown to medium brown 14
14. Second to fifth tergites black with a broad apical yellow band; range: Minnesota and Alberta . . . . 5a. **elegans aquilonia** new subspecies
    Second to fifth tergites rufous, with or without apical yellow bands; range: Upper and Lower Sonoran faunas . . . . 5b. **elegans elegans** Cresson
15. Wings black; size large, the forewing 9 to 16 mm. long 16
    Wings hyaline or subhyaline; size smaller, the forewing 5 to 8 mm. long . 18
16. Hind femur black; first tergite of male black with a pair of white spots.
    6. **nigripes** Cresson
    Hind femur rufous, usually black at each end; first tergite of male entirely black, or sometimes with rufous stains 17
17. Front and middle femora and all tibiae rufous; range: southeastern North Carolina to Florida . . . . 7a. **bipunctata tibialis** Banks
    Front and middle femora and all tibiae black; range: most of the eastern half of the United States . . . . 7b. **bipunctata bipunctata** Say
18. Mesopleuron with a yellow spot next to its coxa; mesoscutum with a small median yellow spot; median posterior part of propodeum with small granular wrinkling . . . . 3. **longipes** Smith
    Mesopleuron without a spot next to its coxa; mesoscutum usually without a median yellow spot; median posterior part of propodeum with fine close punctures. SUBSPECIES OF CUBENSIS 19
19. Smaller punctures on frons and mesoscutum rather weak; abdomen of female mostly red, with pale yellow markings; range: Panama to southern Texas
    2a. **cubensis albopicta** Cresson
    Smaller punctures on frons and mesoscutum sharp; abdomen of female black with pale yellow markings; range: West Indies.
    2b. **cubensis cubensis** Cresson
20. Frons with very small punctures and scattered, rather conspicuous, larger punctures whose diameters are about 2.0 to 3.0 as great as those of the smaller punctures; scutellum usually entirely black 21
    Frons with dense, moderately small punctures and scattered, inconspicuous, larger punctures whose diameters are about 1.2 to 1.5 as great as those of the smaller punctures; scutellum usually with a white spot 22
21. Punctures on mesopleuron separated by about 2.5 their diameter, longer hairs on top of head dark brown, shorter than in *C. rugata;* second flagellar segment about 1.6 as long as wide; male subgenital plate broadly lanceolate, without longitudinal wrinkles beneath; female subgenital plate longer.
    8. **pacifica,** new species

Punctures on mesopleuron separated by about 1.2 their diameter; longer hairs on top of head light brown, longer than in *C. pacifica;* second flagellar segment about 1.3 as long as wide; male subgenital plate with a rounded tip and when dry with a pair of subparallel longitudinal wrinkles beneath that may continue separately to the apex or unite into a single longitudinal wrinkle which continues to the apex; female subgenital plate shorter. 9. **rugata,** new species

22. Hind femur rufous; female subgenital plate a little longer; smaller punctures of thorax sharp . . . . 10. **femoralis** Cresson

Hind femur blackish; female subgenital plate a little shorter; smaller punctures of thorax rather weak . . . . 11. **hatoda** Brimley

MACULATA GROUP

Forewing 4 to 9.5 mm. long; body rather slender; antenna a little longer and more slender than in the other species groups; longer hairs of frons suberect, rather short and sparse; longer hairs on mesoscutum short, inconspicuous; second to fourth segments of fore and middle tarsi of male not unusually short, the second segment of middle tarsus about 2.0 as long as wide; last segment of fore tarsus of male with a median thumblike lobe on the front side; claws on fore and middle tarsi of male with an acute upright tooth, the tooth small and subapical on the claws of the middle tarsus, and on the hind claw of the front tarsus, larger, subbasal, and somewhat appressed on the front claw of the front tarsus; claws on fore and middle tarsi of female with a short, acute, upright, subapical tooth; male subgenital plate semicircular, the margin thin and curled down; female subgenital plate in profile with a projecting apical part whose apex is evenly rounded; male cerci in the form of subcircular flaps that usually protrude beyond the seventh tergite.

The only species of this group known to me is the Holarctic polytypic *C. maculata.*

1. *Ceropales maculata* Fabricius

Forewing 4 to 9.5 mm. long; head and thorax opaque, with small sharp adjacent punctures; mesoscutum with the larger punctures sharp, separated by about their diameter; mesopleuron with the larger punctures somewhat weaker, separated by about twice their diameter. Wings subhyaline.

This is a Holarctic species with a number of subspecies. The typical subspecies, which is European and included for comparison, and the three Nearctic subspecies are described below.

1a. *Ceropales maculata maculata* (Fabricius)

Evania maculata Fabricius, 1775. Systema entomologiae, p. 345, [♀]. Type: ♀, England ("Mus. Bankianum").

Black. Clypeus, labrum, and face laterally (males and females) or entirely (some males), tubercle between antennal sockets in the male, lower lateral part of frons, spot on scape and on pedicel, narrow line on hind orbit above, spot on front callus of pronotum, hind margin of pronotum, postscutellum, callus on hind corner of thorax, outer apical corner of middle and hind coxae, large lateral spot on first tergite, wide hind margin of second tergite, sometimes broken spots on apex of fourth tergite, and large median apical areas on fifth and sixth tergites yellowish white; legs beyond trochanters rufous, the hind tibia apically, often much of the hind tarsus, and often all femora basally and apically infuscate.

This subspecies is common over a large part of Europe.

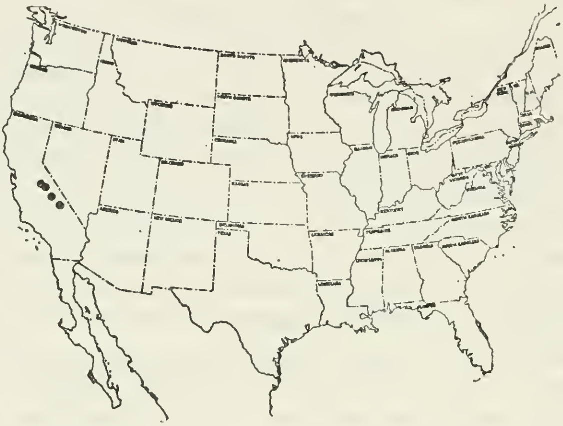


Figure 141.—Localities for *Ceropales maculata caenosa.*

1b. *Ceropales maculata caenosa,* new subspecies

Male: Black. Face, clypeus, labrum, tubercle between antennal sockets, lower lateral part of frons, spot on scape, spot on front callus of pronotum, hind margin of pronotum, postscutellum, small apical lateral spot on propodeum, adjacent small spot at hind corner of metapleuron, underside of fore coxa, outer apex and outer part of under side of middle coxa, apical outer stripe and outer apex of hind coxa, elongate apical spot on back of front femur and on front of middle and hind femora, upper half of front and middle tibiae, spot at base of hind tibia, front and middle basitarsi, large lateral spot on first tergite, apical band on second tergite, narrow rudimentary apical band on fourth tergite, median apical part of fifth and sixth tergites, and apicolateral spot on seventh tergite, clear yellow; femora with limited rufous areas apically; front and middle tibiae and tarsi rufous where not yellow; hind tibia and tarsus dusky rufous, the tibia above and the tarsus apically infuscate.

Female: Black. Side of face, side of frons except above, side of clypeus, narrow margin of labrum, small spot on front callus of pronotum, narrow hind margin of pronotum, often the postscutellum, apical corner of metapleuron, sometimes an adjacent small spot on propodeum, stripe on outer edge of hind coxa, usually a small lateral spot on first tergite, a large dorsal spot on sixth tergite, and often broken apical marks on the second, fourth, and fifth tergites, pale yellow; tibiae and tarsi more or less tinged with dusky rufous.

Type: ♀, taken on flowers in an alpine meadow at 8,500 ft., near Glacier Point, Yosemite Park, Calif., July 20, 1948, Townes family (Townes).

Paratypes: ♂, taken in an alpine meadow at 6,200 ft., Crane Flat, Yosemite Park, Calif., July 25, 1948, Townes family (Townes). 2♀, Devils Post Pile, Calif., Aug. 28, 1937, E. G. Anderson (St. Paul and Townes). 2♀, Huntington Lake at 7,000 ft., Fresno County, Calif., July 16, 1919, E. P. Van Duzee (San Francisco). ♀, Lone Pine, Calif., July 28, 1940, L. J. Lipovsky (Lawrence).

This subspecies seems to occur only in mountain meadows of the Canadian Zone of the Sierra Nevada.

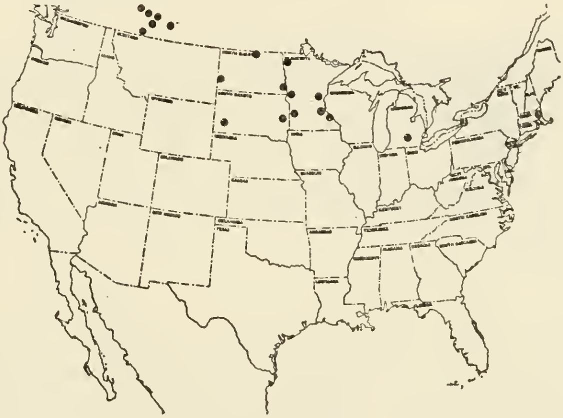


Figure 142.—Localities for *Ceropales maculata rhodomerus.*

1c. *Ceropales maculata rhodomerus*, new subspecies

Colored like the subspecies *fraterna*, except that the legs beyond the trochanters are mostly rufous, the femora being rather clear rufous with the base fuscous and the apex usually with a yellow spot. The hind femur on the front side is mostly clear rufous, while in the subspecies *fraterna* it is mostly brown to blackish. Intergrades between the two forms are common, but are assigned to one subspecies or the other according to the clearness and extent of the rufous color on the front side of the hind femur. A distinct fuscous or brownish tinge or extensive infuscation places the specimen in the subspecies *fraterna*.

Type: ♀, on *Solidago*, Bottineau, N. Dak., Aug. 25, 1919, C. N. Ainslie (Washington, USNM 61710).

PARATYPES (13♂, 20♀): From Alberta (Brooks, Calgary, Coaldale, Gleichen, Medicine Hat, and Waterton Lakes); Manitoba (Winnipeg); Massachusetts (Forest Hills); Michigan (Norvell); Minnesota (Rush City, Fridley Sand Dunes in Anoka County, Hallock, Hendricks, St. Paul, and Traverse County); Montana (St. Marys); New York (Niagara Falls); North Dakota (Beach, Bismark, Bottineau, and Fargo); Saskatchewan (Boucher); and South Dakota (Brookings and Wasta).

Collection dates are rather evenly distributed from May 29 to Sept. 3.

This subspecies or regional variety is the dominant form of *Ceropales maculata* from southern Alberta to the Dakotas, and is found as occasional individuals in an otherwise typical population of *Ceropales macula fraterna* in the Great Lakes region and as far east as Boston, Mass.

1d. Ceropales maculata fraterna Smith

PLATE 1, FIGURE 14

Ceropales fraterna Smith, 1855. Catalogue of the hymenopterous insects in the . . . British Museum, vol. 3, p. 180, ♀. Type: ♀, North America (Oxford).

Ceropales minima Provancher, 1889, Additions et corrections au volume II de la faune entomologique du Canada traitent des Hyménoptères, p. 265, ♂. Type: ♂, Hull, Quebec (Quebec).

Ceropales fraternus occidentalis Cockerell, 1898, Ann. Mag. Nat. Hist., ser. 7, vol. 2, p. 455, ♂. Type: ♂, Ruidoso, White Mts., at about 6500 ft., N. Mex. (Washington).

Biology: Peckham, 1898, Wisconsin Geol. Nat. Hist. Surv. Bull. 2, pp. 154–155, 239.

Black. Face, clypeus, labrum, tubercle between antennal sockets, lower lateral part of frons, short and very narrow postorbital line, spot on scape, small spot on pedicel, spot on front callus of pronotum, hind margin of pronotum, postscutellum, sometimes a spot on the scutellum, large spot above base of hind coxa, sometimes a small spot above base of middle coxa, underside of front coxa, outer apex of middle coxa, apical outer stripe and outer apex of hind coxa, apical spot or area on back of front femur and front of middle and hind femora, upper part of front tibia, spot on base and apex of middle tibia, spot at base of hind tibia, front and middle basitarsi, large lateral spot (in ♂) or wide subapical band (in ♀) on first tergite, apical band on second to third tergites, large medioapical areas on fifth and sixth tergites, and (in ♂) an apicolateral spot on seventh tergite, yellow or creamy white (most frequently creamy white in specimens from the Northeast). In the female a median stripe on the face, clypeus, and often on the labrum is black. Ground color of legs grading from black basally to fulvous apically, the hind femur blackish to light brown with the apex usually paler than the base (also with a yellowish spot on the apex).

This subspecies is the most widespread one in North America. It differs from the subspecies *caenosa* in having a yellow apical band on the third tergite, from *rhodomerus* in having the hind femur blackish or brown rather than rufous, and from *stretchii* in the less extensive yellow markings, having less than the apical third of the hind femur marked with yellow, usually a median black stripe on the face and clypeus of the female, and narrower yellow bands on the abdomen. Intergrades and mixed populations with the other subspecies are common.

Specimens (316♂, 242♀): From Alberta (Gleichen, Lethbridge, Manyberries, and Taber); Arizona (near Alpine, Flagstaff, Graham Mts., Mount Lemmon in the Santa Catalina Mts., and Oak Creek Canyon); British Columbia (Agassiz, Buccaneer Bay, Fernie, Kaslo, Keremens, Lower Post, Royal Oak, Shawnigan, and Vernon); California (Alameda, Antioch, Bear Valley in the Santa Cruz Mts., Berkeley, Big Pine Creek in Inyo County, near Canby, Echo Lake at 7,400 ft., Huntington Lake in Fresno County at 7,000 ft., Kings Mt. in San Mateo County, Ingleside, Lake City, Modoc County, Pacific Grove, San Francisco, Sonoma County, Tahoe, Topaz, and Ulkiah); Colorado (Bayfield, Boulder, Cameron Pass, and Long's Peak Inn); Connecticut (Colebrook, East Hartford, Green Falls, Hillstown, Lebanon, Ledyard, and Salisbury); District of Columbia (Washington); Idaho (Moscow); Illinois (Chicago); Indiana; Iowa (Sioux City); Kansas (Baldwin and Douglas County); Maine (Bangor, Bar Harbor, Brooksville, Casco, Hancock, Lincoln County, Mount Desert, Orono, Saco, Southport, Stacyville, and Stratton); Manitoba (Aweme, Medicine Hat, and Winnipeg); Maryland (Deep Creek Lake and Glen Echo); Massachusetts (Forest Hills, Holden, Holliston Melrose Highlands, Wellesley, Winchendon, and Woods Hole); Michigan (Ann Arbor, Carp Lake in Emmet County, Detroit, High

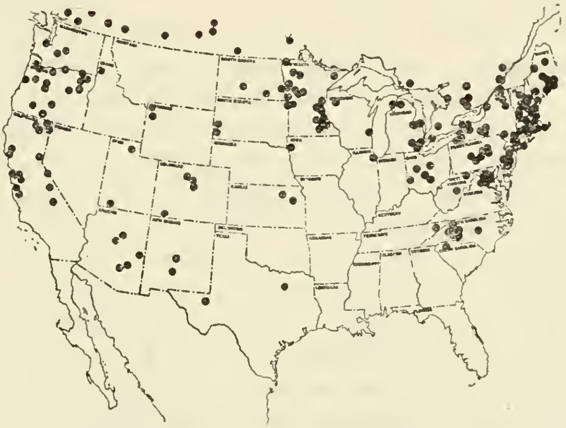


FIGURE 143.—Localities for *Ceropales maculata fraterna*.

Island in Charlevoix County, Isle Royal, La Salle, Port Austin, and Sand Point in Huron County); Minnesota (Beaver Dam in Cook County, Beltrami, Breckenridge, Cass County, Chisago County, Crookston, Fort Snelling, Fridley Sand Dunes in Anoka County, Halsted, Hastings, Itasca Park, Kittson County, Laporte, Minneapolis, Norman County, Pine County, Red Lake County, St. Anthony Park in Ramsey County, St. Paul, St. Peter, Sebeka, Washington County, and Zumbra Heights in Carver County); Montana (Weeksville); New Brunswick (Shediac, St. John, and St. Stephen); New Hampshire (Alstead, Dolly Copp Camp, Durham, Pelham, Pittsfield, Randolph, and Stinson Lake); New Jersey (Clementon, Moorestown, and Morris County); New York (Callicoon, Chaffee, Enfield Glen in Tompkins County, Farmingville, Fishers, Honeoye Falls, Ithaca, Jamestown, McLean, Malloryville, Millwood, New Russia, Niagara Falls, Otto, Roslyn, Thousand Island, and Wilmington); North Carolina (Black Mt., Crabtree Meadows in Yancey County at 3,600 ft., Hamrick, Marion, Mount Mitchell, Pineola, and Raleigh); North Dakota (Bismarck, Cass County, and Verona); Nova Scotia (Kings County and Petite Rivière); Ohio (Barberton, Butler County, Columbus, Hocking County, and Logan County); Ontario (Gull Lake in the Muskoka District, Jordan, Mer Bleue, Orillia, Ottawa, Spencerville, Sudbury, and Toronto); Oregon (Baker, 8 miles south of Chemult, Crater Lake, 10 miles south of The Dalles, Devils Lake in Deschutes County, Enterprise, Grant County, Forest Grove, Grants Pass, Hillsboro, Milton, Mount Jefferson, Newport, Shaniko, and Union); Pennsylvania (Clarks Valley, Dupont, Enola, Harrisburg, Linglestown, Moosic, and Philadelphia); Prince Edward Island (Dalvay House in the Canadian National Park); Quebec (Aylmer, Hemmingford, Hull, Joliette, Kazubazua, and Montreal); Rhode Island (Kingston); Saskatchewan (Waskesiu Lake); South Carolina (near Tigerville); South Dakota (Custer and Hill City); Tennessee (Roan Mt.); Texas (Dallas and between the Sapello and Pecos Rivers); Utah (Kaibab Forest, Logan, and Logan Canyon); Vermont (Fairlee, Jacksonville, Lyndon, and Woodstock); Virginia (Dunn Loring, Falls Church, Glencarlyn, and Great Falls); Washington (Blue Mts., Easton, Nelson's in the Yakima Valley, Olympia, and Paradise Valley on Mount Rainier); West Virginia (French Creek); Wyoming (Grand Teton National Park and Yellowstone National Park); and México ("Meadow Valley" in the Sierra Madre).

The great majority of collection dates are in July, August, and the first half of September, though others indicate that the species may be less frequently collected from late spring to late in September and rarely earlier or later. Some unusually early and late dates of interest are: Apr. 12 at Kings Mt., San Mateo County, Calif.; April at Baldwin, Kans.; May 1 at Raleigh, N. C.; May 15 at Verona, N. Dak.;

May 20 at Falls Church, Va.; May 28 at Tabor, Alberta; June 1 at Forest Grove, Oreg.; Sept. 30 at Ulkiah, Calif.; Oct. 3 at Ann Arbor, Mich.; Oct. 10 at Linglestown, Pa.; Oct. 13 at Jordan, Ont.; and Oct. 24 at Antioch, Calif. Flower records include *Ranunculus californicus, Medicago sativa, Polygonum* sp., *Eriogonum* sp., *Aralia spinosa, Lomatium* sp., *Pastinaca sativa, Daucus carota* (5 collections), *Aster* sp., and *Solidago* spp. (3 collections). One collection is from honeydew of *Cirsium lanceolatum*. In my own collecting experience the species is rather common on flowers, and may be found on shrubby undergrowth around the edges of or in clearings in woods.

This subspecies is transcontinental, primarily in the Canadian and Transition Zones. In the far West it is largely replaced by the subspecies *stretchii* and *caenosa*, and in the Alberta to Dakotas area by the subspecies *rhodomerus*. Adults are on the wing mostly from July 1 to Sept. 15.

1e. *Ceropales maculata stretchii* Fox

Ceropales stretchii Fox, 1892, Trans. Amer. Ent. Soc., vol. 19, p. 52, ♀. Lectotype: ♀, California (Philadelphia).

Black. Yellow and rufous markings similar to those of the subspecies *fraterna*, but the yellow marks more extensive (and never whitish as is frequently the case in *fraterna*). The face, clypeus, and labrum of the female never have a median black stripe, the yellow on the front side of the hind femur occupies from the apical third to most of its length, and the yellow bands on the abdomen are very wide. The yellow on the hind femur may be broken basally into small blotches, yet if these reach basad one third the length of the femur the specimen should be referred to the present subspecies. The first tergite is yellow for about 0.4 its length in the male and 0.6 its length in the female, the two lateral yellow spots of the male being approximate on the midline or fused into a continuous transverse band.

Intergrades with the subspecies *fraterna* are the rule where the ranges of the two overlap. Females of *stretchii* are more strongly differentiated from those of *fraterna* than are males, and in many localities where most of the females may be referred to *stretchii*, most of the males are indistinguishable from *fraterna*.

Specimens (39 ♂, 80♀): From British Columbia (Keremeos, Lillooet, Royal Oak, and Vernon); California (Alameda, Angora Peak, Antioch, Bear Valley in the Santa Cruz Mts., Berkeley, Bess Lake, near Boulder Creek in Boulder County, Carmel, mountains near Claremont, Cuyamaca in San Diego County, Gold Lake in Sierra County, Ingleside, Kern Lake to Rock Creek in Tulare County, Lake City, Mill Valley in Marin County, Modoc County, Monterey, Oak Glen Lodge in San Bernadino County, Orick, Pacific Grove, Paraiso Springs, Plumas County, Quincy, Redwood City, Richardson

Springs, San Francisco County, Santa Cruz, Sobre Vista in Sonoma County, Strawberry, Tamales Bay, Wells, and Wildcat Canyon in Contra Costa County); Idaho (Moscow); Nevada (Wells); Oregon (Crater Lake, Crescent, Diamond Lake in Douglas County, Enterprise at 3,750 ft., and Eugene); Utah (Provo); and Washington (Nelsons, Pullman, Steverson, and Yakima).

Collection dates are from Mar. 15 at Mill Valley, Marin County, Calif., to Oct. 23 at San Francisco, Calif. Most are in June, July, August, and September. Flower records comprise *Eriogonum* and *Achillea lanulosa.*

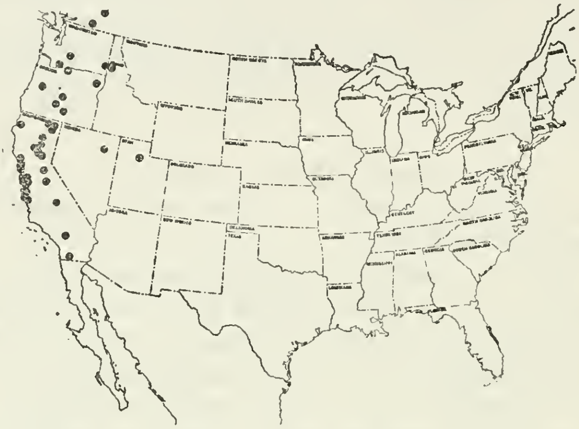


FIGURE 144.—Localities for *Ceropales maculata stretchii.*

This subspecies occurs most typically throughout California east of the crest of the Sierra Nevada, though in northern California and in the Coast Range specimens of the subspecies *fraterna* and intergrades are common. It extends northward with more pronounced dilution with *fraterna* into British Columbia and westward to Idaho and northern Nevada and Utah. Adults are commonest during the summer and early fall.

ROBINSONII GROUP

Forewing 5.5 to 16 mm. long; body of medium build; antenna of moderate length; hind legs long; longer hairs of frons suberect, rather short and sparse; longer hairs on mesoscutum short, inconspicuous; second to fourth segments of fore and middle tarsi of male not unusually short, the second segment of the middle tarsus distinctly longer than wide; hind tarsus unusually long; last segment of fore tarsus of male with a strong median thumblike lobe on the front side; claws on fore and middle tarsi of male with a large, appressed, obliquely truncate tooth, the tooth postmedian on the claws of the middle tarsus and on the hind claw of the front tarsus, shorter, more pointed, and subbasal on the front claw of the front tarsus; claws on fore and middle tarsi of female with a large, appressed, obliquely truncate, postmedian tooth; male subgenital plate broad, semicircular or subtriangular, its apex rounded or emarginate, its edges turned down, often thickened; female subgenital plate in profile with a projecting apical part whose apex is evenly rounded; male cerci in the form of semicircular or short triangular flaps that usually protrude beyond the seventh tergite.

This group contains two subgroups: 1. The *bipunctata* subgroup comprising large species with the male subgenital plate rounded at the apex, the head rather broad, and the finer punctures on the thorax small and very dense. The Nearctic *elegans*, *nigripes*, and *bipunctata* are included. 2. The *robinsonii* subgroup comprising usually medium sized species with the male subgenital plate more or less pointed at the apex, head slightly narrower, and the thoracic punctation variable. The propodeum is usually somewhat swollen basally, the basal swelling divided medially by an impression or broad groove. The Nearctic *robinsonii*, *cubensis*, and *longipes* and a host of Neotropic species belong here. Some Nearctic representatives of the *fulvipes* and *femoralis* groups are common in México or range even to Panamá, but all the strictly Neotropic species of *Ceropales* I have seen belong to the present subgroup.

2. *Ceropales cubensis* Cresson

Forewing of male 5 to 8 mm. long, of female 6.5 to 9 mm. long; frons, mesoscutum, and mesopleuron with dense small punctures and scattered large punctures, the latter averaging a little smaller than in the related species *longipes;* propodeum tumid basally, the basal swelling divided medially by a longitudinal groove that is broadened basally into an impressed triangular area; apical half of propodeum a little concave medially, but convex next to the attachment of the abdomen; median apical portion of propodeum with rather dense fine punctures that are stronger and somewhat irregular medially; male subgenital plate broadly lanceolate with a blunt tip. The details of the subgenital plate are specifically diagnostic.

Black. Face (except small area below antennal tubercle of female), clypeus (except a small median area in the female), side 0.25 of frons, antennal tubercle, narrow postorbital stripe, labrum (except central part in the female), scape except above (or only below in the female), underside of pedicel, underside of base of first flagellar segment in the male, sometimes a spot on outer base of mandible, anterior callus and hind margin of pronotum, rarely a small median spot on mesoscutum, small central spot on scutellum, postscutellum, hind corner of thorax, underside of front coxa, apical outer marks on middle and hind coxa, usually the apical margins of the trochanters, front tibia and basitarsus of male dorsally, middle basitarsus of male except at the apex, apical marks on front and middle femora of male (these marks sometimes present but small in the female), sometimes a small spot on outer apex of hind femur of male, apical blotches or bands on fore and middle tibiae (large in the male, reduced in the female), and certain abdominal markings, pale yellow or ivory. The abdominal markings of the female vary with the subspecies and are described under the subspecific headings; those of the male are as follows: a large, sublateral, subapical, quadrate spot on the first tergite, subapical transverse bands on second to fifth tergites (deeply notched sublaterally), a large median and a somewhat smaller sublateral spot on sixth tergite (these sometimes narrowly joined along the hind margin), and a large subcircular median spot on seventh tergite, pale yellow or ivory; wings subhyaline; palpi pale brown; legs fulvous, the coxae and trochanters often more or less fuscous; hind tarsus and apices of tibiae sometimes infuscate; male subgenital plate with a broad whitish margin, within which is a blackish border extending to the median basal triangular piece, which is whitish with a blackish triangular center.

There are two subspecies, one in the West Indies and one from Panamá to southern Texas. They differ in the sharpness of the small punctures on the head and thorax and in the color of the female abdomen. Their male genitalia are identical.

2a. *Ceropales cubensis albopicta* Cresson, new status

Ceropales albopicta Cresson, 1869, Proc. Boston Soc. Nat. Hist., vol. 12, p. 378, "♀" = ♂. Lectotype: ♂, Orizaba, México (Philadelphia).

Smaller punctures on frons, mesoscutum, and mesopleuron rather weak and often not well defined.

Hind tibia and tarsus rufous, the tarsus often somewhat infuscate; abdomen of female rufous, the first tergite more or less infuscate basally, usually with a small subapical dorsolateral ivory colored spot, and the abdominal tergites with additional ivory subapical marks as follows: irregular sublateral transverse marks on the second tergite, similar but medially approximate marks on the third tergite (these are often broken into a median and a sublateral pair of marks), a large median and smaller sublateral transverse marks on the fourth tergite, a large median semicircular mark on the fifth tergite, and a large median subcircular spot covering the median part of the sixth tergite.

This is the form identified by Fox (1892, Trans. Amer. Ent. Soc., vol. 19, p. 56) as *Ceropales agilis* Smith, 1864. Mr. I. Yarrow has compared specimens with the type of *agilis* in London and finds that *agilis* is a distinct species, with some colorational differences, and large coarse punctures on the frons and clypeus.

Specimens: ♀, Brownsville, Tex., July (Townes). ♂, Brownsville, Tex., 1921, J. C. Bridwell (Washington). ♀, Presidio, Tex., Apr. 2 to May 9, 1941, W. L. Lowry (Washington). ♂, Presidio, Tex., May 25, 1935, L. W. Noble (Washington). ♀, Lake Atitlán, Guatemala, Aug. 15, 1951, R. H. Painter (Evans). ♀, Puerto Castilla, Honduras, J. C. Bequaert (Cambridge). ♂, Mulege, Baja California, México, May 14, 1921, E. P. Van Duzee (San Francisco). ♂, San Jose de Guayamas, México, Apr. 10, L. O. Howard (Washington). ♂, Tejupilco, Temescaltepec, México, June 17, 1933, H. E. Hinton and R. L. Usinger (San Francisco). ♂, Villagran, Tamaulipas, México, June 7, 1951, H. E. Evans (Evans). 2 ♀, México (Philadelphia). ♂, Neuvo Limón, Panamá, Sept. 1946, N. L. H. Krauss (Townes).

This subspecies occurs from Panamá into southern Texas.

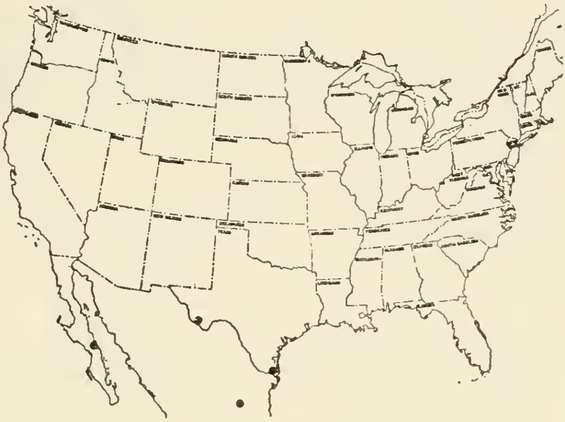


FIGURE 145.—Localities for *Ceropales cubensis albopicta.*

2b. *Ceropales cubensis cubensis* Cresson

Ceropales cubensis Cresson, 1865, Proc. Ent. Soc. Philadelphia, vol. 4, p. 132, "♀"=♂. Lectotype: ♂, Cuba (Philadelphia).

Smaller punctures on frons, mesoscutum, and mesopleuron sharp and distinct.

Hind tibia rufous, the apex usually somewhat infuscate, or in some females the entire tibia infuscate; abdomen of female blackish, marked with white or ivory as follows: sublateral subapical reniform spot on first tergite, subapical stripe on second to fourth tergites (these with a deep sublateral emargination); a median semicircular apical spot and usually a smaller sublateral spot on fifth tergite; and a large subcircular spot covering the median portion of the sixth tergite. The pattern of pale spots is the same as in the subspecies *albopicta*, but the average extent of these markings is greater.

SPECIMENS: ♂ (type), Cuba (Philadelphia). ♂, St. Georges, leeward side of Grenada, West Indies, H. H. Smith (Washington). ♂, ♀, Kingston, Jamaica (Washington and Townes). ♀, Santo Domingo (Washington). ♂, ♀, no data (Washington).

This subspecies is restricted to the West Indies.

3. *Ceropales longipes* Smith

Ceropales fasciata Say, 1824, *in* Keating, Narrative of an expedition to the source of St. Peter's River . . . , etc., vol. 2 (appendix), p. 333 (Leconte edition, vol. 1, p. 224) (name preoccupied by Fabricius 1793). Type: ♂, Missouri (destroyed).

Ceropales longipes Smith, 1855, Catalogue of the hymenopterous insects in the . . . British Museum, pt. 3, 179, ♀. Type: ♀, Georgia (London).

Ceropales frigida Smith, 1855. Catalogue of the hymenopterous insects in the . . . British Museum, pt. 3, p. 180 (new name for *C. fasciata* Say).

Forewing of male 7 to 8 mm. long, of female 8 to 10 mm. long; frons, mesoscutum, and mesopleuron with dense small punctures and scattered very large punctures; propodeum rather flat behind, but with a weak subbasal swelling which is divided by a longitudinal groove and a basal impressed triangular area; median apical portion of propodeum with fine, completely irregular wrinkles which give it a coarsely granular appearance; male subgenital plate broadly lanceolate with a blunt tip, a narrow whitish margin, and the rest of the lower surface dusky fulvous, darkest toward the median accessory triangular piece which is whitish with a darker center. The details of the subgenital plate are specifically diagnostic.

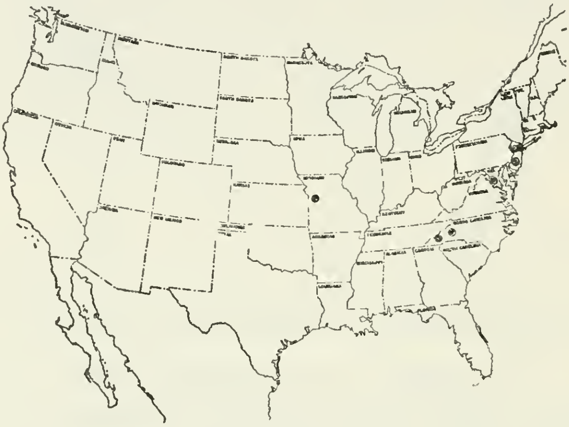


Figure 146.—Localities for *Ceropales longipes*.

Black. Face (except small area below antennal tubercle of female), clypeus, side 0.25 of frons, antennal tubercle, narrow postorbital stripe, labrum, outer face of mandible, palpi, underside of scape and pedicel, anterior callus and hind margin of pronotum, more or less of tegula, small median longitudinal mark on mesoscutum, central spot on scutellum, postscutellum, triangular spot on mesopleuron next to its coxa, spot on hind corner of thorax elongated as short stripe along pleuropropodeal suture, adjacent spot on propodeum, underside of fore and middle coxae, apical spot beneath and connecting lateral stripe on hind coxa, sometimes the apical margins of trochanters, apical spots on femora (smaller and less distinct in the female), apical and basal spots or bands on tibiae (smaller and less distinct in the female and often obsolete on the hind tibia of both sexes), upper side of front tibia and basitarsus of male, middle basitarsus of male except at the apex, a large sublateral subapical spot on first tergite, subapical transverse bands on second to fifth tergites (deeply notched sublaterally and often interrupted medially), a large median and a somewhat smaller sublateral spot on sixth tergite of male, large transverse subapical mark on sixth tergite of female, and a large subcircular median spot on seventh tergite of male, pale yellow; wings subhyaline; legs beyond coxae pale fulvous except as previously noted as yellow, the extreme bases of segments 2 to 4 of hind tarsus blackish.

Specimens: ♀, Washington, D. C., Aug. 8, 1946, M. Vogel (Vogel). ♂, Atherton, Mo., July 16, 1922, C. F. Adams (Lawrence). ♂, Moorestown, N. J., July 19, 1939, H. and M. Townes (Townes). 2 ♂, 1 ♀, Crabtree Meadows, from foliage near the ground in an opening in mixed hardwoods, 3,600 ft., Yancey County, N. C., Aug. 21 and 25, 1950, H., M., and D. Townes (Townes). ♀, Smokemont, 2,000 ft., Smoky Mts., N. C., Aug. 24, 1930, N. Banks (Cambridge).

This species occurs from New Jersey to Georgia and west to Missouri.

4. *Ceropales robinsonii* Cresson

Forewing of male 6 to 9 mm. long, of female 7.5 to 11 mm. long; frons, mesoscutum, and mesopleuron polished, densely hairy but the hairs not set in distinct punctures, the larger punctures that are present in most other species of the genus absent or very faintly indicated; propodeum tumid basally, the basal swelling divided medially by a longitudinal groove that is broadened basally into an impressed triangular area, the rest of the propodeum behind almost flat; hind face of propodeum near the abdominal attachment with irregular wrinkles that in general converge toward the abdominal attachment; male subgenital plate broadly lanceolate with a blunt tip, fulvous with the margin a little paler. The details of the subgenital plate are specifically diagnostic.

Head and thorax blackish marked with yellow; legs and abdomen rufous, with restricted yellow markings; wings sybhyaline to dark brown.

There are two subspecies, distinguishable on color as indicated in their descriptions. One occurs from Massachusetts and Illinois to Florida, the other in Kansas and Texas.

4a. *Ceropales robinsonii robinsonii* Cresson

Ceropales robinsonii Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 140, ♂. Type: ♂, West Virginia (Philadelphia).

Ceropales rufiventris Walsh and Riley, 1869, Amer. Ent., vol. 1, pp. 136, 163, ♂, ♀. Types: ♂, ♀ ♀, Illinois (destroyed).

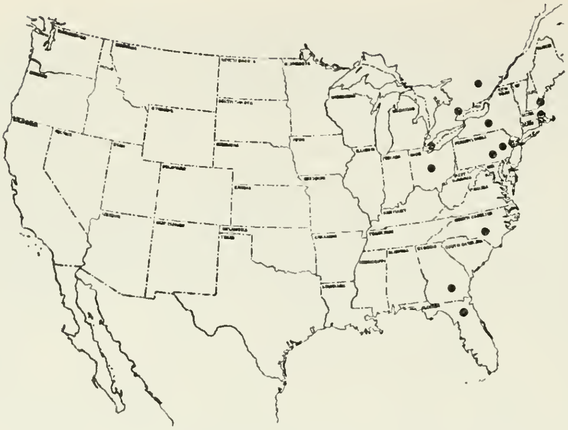


FIGURE 147.—Localities for *Ceropales robinsonii robinsonii.*

Ceropales superba Provancher, 1883, Naturaliste Canadien, vol. 14, p. 35 (Faune, p. 810), ♀. Type: ♀, Toronto, Ontario (Ottawa).

Biology: Walsh and Riley, 1869, Amer. Ent., vol. 1, pp. 136, 163.

Forewing of male 6 to 7.5 mm. long, of female 7.5 to 9 mm. long. Head and thorax black; abdomen and legs rufous. Face (except a small area below antennal tubercle in the female), clypeus (except for a median brownish spot in the female), side 0.2 of frons, antennal tubercle, moderately wide postorbital mark, labrum, outer face of mandible, underside of scape and pedicel, under side of basal flagellar segment of male, anterior callus and hind margin of pronotum, usually a small median spot on mesoscutum of male, small median spot on scutellum of male and sometimes of female, postscutellum, hind corner of thorax, underside of front coxa, apical outer spots on middle and hind coxae (smaller and less distinct in the female), dorsal side of front tibia, apical marks on outer side of femora and basal and apical marks on tibiae (these are less extensive and distinct on hind legs and on all legs of female), a small sublateral subapical spot on second tergite of male, and sometimes a smaller similar spot on third tergite of male, light yellow; tarsi yellowish, fulvous apically, the second to fourth segments of hind tarsus narrowly blackish at the base; apical abdominal segment with a median apical obscurely yellowish area; palpi and tegula light brown; front coxa dark brown (except where noted as yellow); middle and hind coxae brownish at the base; tarsi yellowish, rufescent apically; wings subhyaline in small males, in females and in larger males brown with an apical paler area in the forewing; flagellum blackish except for a yellow mark on the underside of basal segment in the male.

SPECIMENS: ♀, Gainesville, Fla., May 18, 1928, Alexander and Walker (Ann Arbor). ♀, Tifton, Ga., May 18, 1896 (Washington). ♂, ♀, Tifton, Ga. (Washington). ♀, Tifton, Ga., F. A. Eddy (Cambridge). ♂, reared from clay cocoon, Jan. 7, 1915, F. X. Williams (San Francisco). ♀, Forest Hills, Mass., Aug. 1906, C. T. Brues (Cambridge). ♀, Pelham, N. H., Sept. 2, 1905, J. C. Bridwell (Washington). ♂, on flowers of *Cicuta maculata*, McLean, N. Y., July 19, 1916, E. G. Anderson (Ithaca). 2♀, Southern Pines, N. C., Aug 1, 1911, and Aug 11, 1909, A. H. Manee (Cambridge). ♂, reared from cells of *Phanagenia bombycina*, Columbus, Ohio, May 12, 1902 (Washington). ♀, South Bass Island, Put in Bay, Ohio, July 11 to 20 (Cambridge). ♀, Ottawa, Ontario (Ottawa). ♀, Charter Oak, Pa., July 11, 1917, H. B. Kirk (Townes). ♀, emerged May 10, 1909, from material collected Apr. 9, 1909, Linglestown, Pa., P. R. Myers (Washington). ♀, Whitehaven, Pa., Aug. 1902, J. C. Bradley (Ithaca). ♀, Pennsylvania, Melsheimer (Cambridge). 2♀, from Fitch Collection (Washington). ♂ (type of *rufiventris*), West Virginia (Philadelphia).

This is a rare insect, occurring from Massachusetts to Florida and west to Illinois. Its social host is *Phanagenia bombycina*.

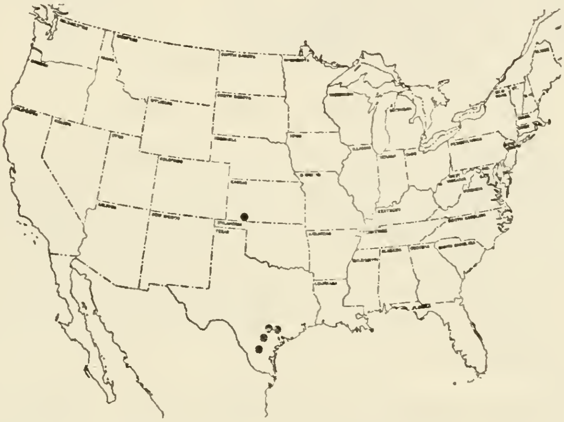


Figure 148.—Localities for *Ceropales robinsonii stigmatica*.

4b. *Ceropales robinsonii stigmatica* Banks

Ceropales robinsoni (!) *stigmatica* Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 126, ♀. Lectotype: ♀, Fedor, Lee County, Tex., May 17, 1909 (Cambridge).

Forewing of male about 8 to 9 mm. long, of female 10.5 to 11.0 mm. long.

Head and thorax blackish; legs and abdomen rufous. Face (except a triangular area below antennal tubercle in female), side 0.2 of frons, antennal tubercle, rather wide postorbital mark, labrum (centrally somewhat fulvous in the female), outer face of mandible, underside of scape and pedicel, anterior callus of pronotum and surrounding area, broad hind margin of pronotum, rarely a small median spot near hind margin of mesoscutum, scutellum, postscutellum, spots on mesopleuron and metapleuron next their coxae, hind corner of thorax, and abdominal markings varying from broad subapical transverse bands on second and following tergites (enclosing a small sublateral rufous spot) to subapical median subquadrate spots on the apical tergites, yellow; antenna rufous, the apical 0.3 (in the ♂) or 0.2 (in the ♀) infuscate; palpi and tegula yellow and brown; thorax with more or less extensive brownish ferruginous areas, these mostly adjacent to its yellow markings; wings dark brown, or lighter brown in small males, the forewing with an apical pale area; legs colored as in the subspecies *robinsonii*, except that the front coxa is largely brownish ferruginous.

Specimens: ♀, Meade County, Kans., July 12, 1911, F. X. Williams (Lawrence). ♀, Cotulla, Tex., May 12, 1906, F. C. Pratt (Washington). 6♂, 13♀ (including the lectotype), Fedor, Tex., Mar. 29, 1909, Apr. 19, 1904, Apr. 29, 1909, May 6 and 17, 1909, July 10, and Aug. 10, Birkmann (Cambridge). ♂, McDade, Tex., June 9, 1935, J. E. Gillaspy (College Station, Tex.). ♀, Wilson County, Tex., Feb. 6, 1934, C. E. Heard (Krombein).

This subspecies occurs in Texas and Kansas.

5. *Ceropales elegans* Cresson

Forewing of male 7 to 13 mm. long, of female 8 to 13 mm. long; frons, mesoscutum, and mesopleuron with very fine and dense punctures and scattered moderately large punctures; propodeum tumid basally, the basal swelling weakly divided longitudinally by a longitudinal groove which is somewhat broadened at the base of the propodeum; apical half of propodeum flat behind, with very fine dense punctures; subgenital plate semicircular, concave below, the apex weakly retuse.

Coloration light rufous, with varying amounts of yellow and sometimes also with black markings. Antenna fulvous, infuscate at the apex. The subspecies *aquilonia* is predominately black and yellow. Wings subhyaline to dark brown.

There are three subspecies, separable on color as idicated in the key and in the descriptions below.

5a. *Ceropales elegans aquilonia*, new subspecies

Male: Forewing 7.2 to 7.8 mm. long.

Blackish. Face, clypeus, lateral 0.2 of frons, antennal tubercle, narrow postorbital mark, labrum, outer face of mandible, underside of scape and pedicel, large spot over pronotal callus, wide hind margin dorsally and narrower hind margin laterally of pronotum, spot on center of scutellum, postscutellum, small spot on mesopleuron next to its coxa, large spot on hind corner of thorax, under side of front coxa, ventrolateral part of middle coxa, broad lateral stripe on hind

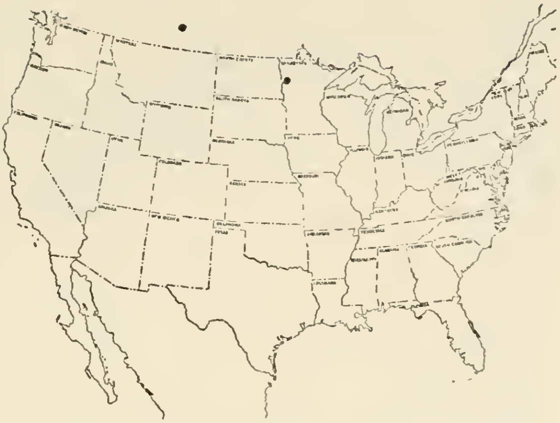


FIGURE 149.—Localities for *Ceropales elegans aquilonia.*

coxa, apical mark on all femora, upper side of front tibia, basal and apical mark on middle tibia, basal mark on hind tibia, most of front and middle basitarsi except at the apex, and a very broad apical band on all tergites, light yellow, the apical bands on the third and fourth tergites each with a sublateral notch in the front edge; much of temple rufous; antenna rufous, somewhat fuscous at the apex, and marked with yellow as previously noted; palpi rufous; pronotum and coxae with extensive rufous areas; legs beyond coxae rufous except for the yellow markings noted; tegula rufous; wings faintly tinged with reddish brown; first tergite rufous with the apex yellow; underside of abdomen tinged with rufous.

FEMALE: Unknown, but probably with somewhat similar coloration.

This subspecies is distinguished by its pale wings, thorax black and yellow, and abdomen mostly black and yellow.

TYPE: ♂, Tilley, Alberta., July 9, 1941, J. L. Carr (Washington, USNM 61800).

PARATYPE: ♂, Norman County, Minn., Aug. 31, 1936, D. G. Denning (St. Paul).

5b. *Ceropales elegans elegans* Cresson

Ceropales elegans Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 208, ♀. Type: ♀, Texas (Philadelphia).

Ceropales cressoni Fox, 1892, Trans. Amer. Ent. Soc., vol. 19, p. 58, ♂, ♀. Lectotype: ♀, Nebraska (Philadelphia).

Forewing of male 7.2 to 11 mm. long, of female 8 to 12 mm. long. This subspecies is quite variable in color. The wings are definitely tinged with brown, a little darker than in the subspecies *aquilonia,* but not reaching the dark brown color of the subspecies *quaintancei.* The yellow markings are sometimes as extensive as described for the subspecies *aquilonia,* but usually more restricted, and may be present

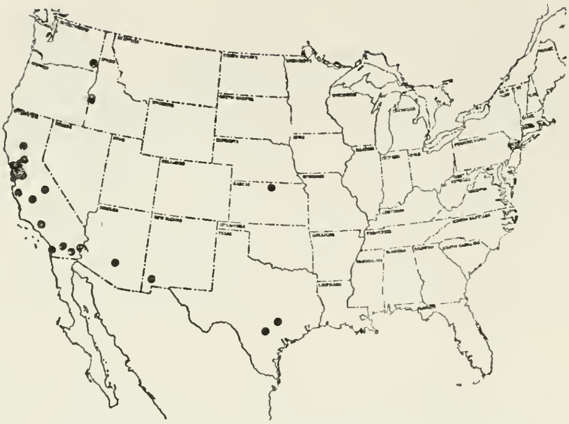


Figure 150.—Localities for *Ceropales elegans elegans.*

only on the head, hind margin of pronotum, hind corner of thorax, underside of front coxa, and as a spot on the last tergite. The head, thorax, and more rarely the abdomen may be partly blackish.

Specimens (32♂, 25♀): From Arizona (Tucson); California (Arroyo Seco in Monterey County, Benicia, Blythe, Clayton, Coachella, below 5,000 ft. near Coalinga, Davis, Imperial County, La Jolla, Lemoncove, Los Angeles County, Redwood City, Richardson Springs, Telsa, Tracy, Vacaville, and Walnut Creek in Contra Costa County); Idaho (Payette and Weiser); Kansas (Republic County); Nebraska; New Mexico (15 miles east of Lordsburg at 4,500 ft.); Texas (Bexar County and Lee County); and Washington (Wawawai).

Collection dates are rather evenly distributed from May 20 (in Imperial County, Calif.) to Sept. 29 (in Lee County, Tex.). Flower records comprise *Tamarix gallica, Melilotus alba,* and *Eriogonum* sp. There is one collection from the glandular hairs of *Helianthus anuus.*

This subspecies occurs in the Upper and Lower Sonoran faunas. Adults are on the wing throughout the summer.

5c. *Ceropales elegans quaintancei* Viereck

Ceropales quaintancei Viereck, 1902, Ent. News, vol. 13, p. 275, "♂"= ♀. Type: ♀, College Park, Md. (Philadelphia).

Forewing of male 9 to 13 mm. long, of female 11 to 13 mm. long.

This subspecies has dark brown wings and averages a little larger than the other two. The yellow markings may be almost as extensive as described for *aquilonia* or more or less restricted, in extreme cases being present only on the head, postscutellum, hind corner of thorax, and underside of front coxa. The thorax sometimes has fuscous areas.

Specimens: 2♂, Alachua County, Fla., May 13, 1923, Alexander and Walker (Ann Arbor). ♀, Tifton, Ga. (Washington). ♀. Rantoul, Ill., Nov. 1912, G. N. Wolcott (Washington). ♀, Toledo, Ill., Harvey (Lawrence). ♀, Douglas County, Kans., F. H. Snow (Ithaca). 4♂, 2♀, on flowers of *Melilotus alba,* Marshall County, Kans., July 6, 12, 24, and 26, 1950, R. L. Fischer (Evans and Townes). 2♀, Onaga, Kans., Crevecoeur (Manhattan). ♀ (type), College Park, Md. (Philadelphia). ♂, Southern Pines, N. C., June 15, 1910, A. H. Mance (Cambridge).

This subspecies occurs in the Carolinian and Austroriparian faunas.

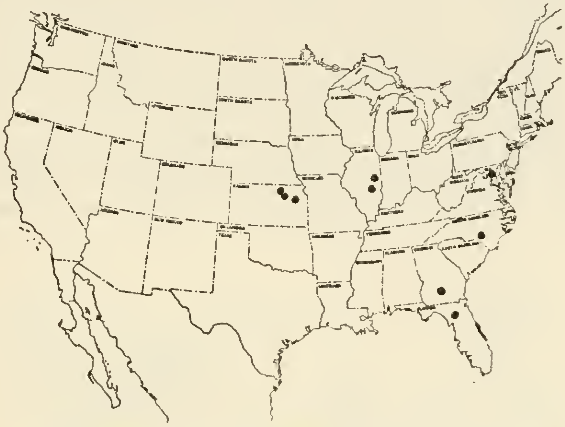


FIGURE 151.—Localities for *Ceropales elegans quaintancei.*

6. *Ceropales nigripes* Cresson

Ceropales nigripes Cresson, 1867, Trans. Amer. Ent. Soc., vol. 1, p. 139, ♀. Type: ♀, "Dakota" (Philadelphia).

Ceropales texana Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 208, ♂. Type: ♂, Texas (Washington).

Forewing of male 9 to 14 mm. long, of female 11 to 16 mm. long; structure similar to that of *C. bipunctata* except that the propodeum usually lacks the fine transverse wrinkling and for small differences in the male genitalia.

Black. Male with face, clypeus, labrum, lower lateral part of frons, antennal tubercle, spot on underside of scape and of pedicel, broad band on hind margin of pronotum, sometimes a small spot on scutellum, postscutellum, small spot above hind coxa, rarely a small spot on apex of hind coxa in front, large oblong lateral spot on first tergite, usually one or several small median apical spots on fifth tergite, large median spot on sixth tergite and most of seventh tergite, white. The labrum may have a brownish median spot or may be dark with only its sides white. Female with frontal orbit, sometimes a lateral spot on clypeus, spot on postscutellum, and small spot above hind coxa, white. Wings of both sexes deep black.

This is very close to *C. bipunctata* and has allopatric distribution. It is rated as a full species rather than as a subspecies of *bipunctata* because there are several distinctive color differences, the male genitalia are slightly different, and no intergrading specimens are at hand.

Specimens (35♂, 33♀): From British Columbia (Osoyoos); California (Berkeley, Dos Palos, Los Angeles County, Newport Bay, San Francisco, and Telsa); Colorado (Colorado Springs, Sterling, and Two Buttes); Idaho (Lewiston and Payette); Kansas (Cloud County, Dickinson, Hamilton County, Kiowa County, Logan County, Manhattan, Morton County, Reno County, Trego County, Wallace County, and Wichita County); Nebraska (Bartley and Cambridge); New Mexico (Albuquerque, Broadview, Las Vegas, 20 miles north of Las Vegas at 6,650 ft., and Ship Rock); Oregon (Juntura, The Dalles, and La Grande); Texas (Fort Davis); Utah (Utah Lake); Washington (Almota and Wawawai); Wyoming (Newcastle and Weston County); and Mexico (Canutillo in Durango and 15 km. east of Sombrerete in Zacatecas).

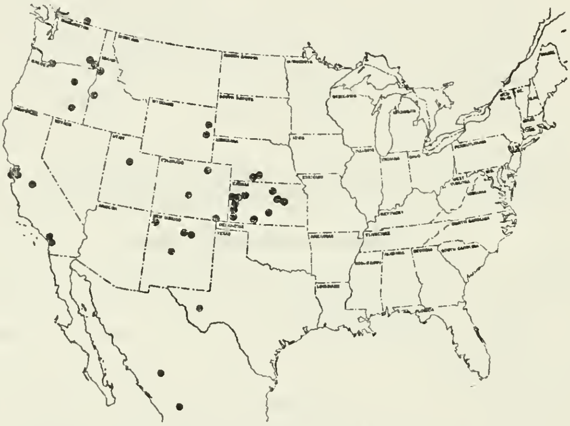


Figure 152.—Localities for *Ceropales nigripes*.

Most collection dates are in July and August. Those outside these two months are: June 25 at Sterling, Colo.; June 29 at Payette, Idaho; June 30 at Cambridge, Nebr., "June" in Morton County, Kans.; Sept. 2 at Dos Palos, Calif.; Sept. 16 at Manhattan, Kans.; and Sept. 25 at Telsa, Calif. Flower records comprise *Tamarix gallica*, *Melilotus alba* (2 collections), *Sphaeralcea angustifolia*, *Eriogonum* sp., *Asclepias verticillata*, and *Asclepias* sp.

This species occurs in the Upper and Lower Sonoran faunas. Adults fly mostly in July and August.

7. *Ceropales bipunctata* Say

Forewing of male 10 to 16 mm. long, of female 11 to 16 mm. long; frons, mesoscutum, and mesopleuron with very fine and dense small punctures and scattered larger punctures; propodeum with a median basal tumid area which has a weak median longitudinal impression; apical half of propodeum almost flat behind, with fine, very dense punctures and very fine transverse wrinkles; subgenital plate semicircular, concave beneath.

There are two subspecies, distinguished by the color of the tibiae as noted in the key and the subspecific descriptions.

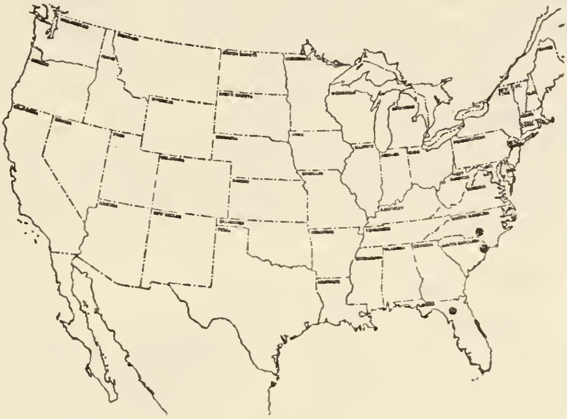


FIGURE 153.—Localities for *Ceropales bipunctata tibialis.*

7a. *Ceropales bipunctata tibialis* Banks

Ceropales bipunctata var. *tibialis* Banks, 1910, Journ. New York Ent. Soc., vol. 18, p. 126, ♂, ♀. Lectotype: ♀, Southern Pines, N. C., June 20, 1906, A. H. Manee (Cambridge).

Ceropales floridensis Dreisbach, 1948, Journ. New York Ent. Soc., vol. 56, pp. 233–238, "♀"=♂ (new synonymy). Type: ♂, Gainesville, Fla. (Ann Arbor).

Black. Marked with creamy white as in the subspecies *bipunctata;* wings deep black; legs rufous with the trochanters and joint regions infuscate; thorax and head sometimes with rufous tinges.

The name *Ceropales floridensis* is based on a specimen of this subspecies with the white and rufous markings unusually extensive.

SPECIMENS: ♂ (type of *floridensis*), Gainsville, Fla., May, 4, 1933, Alexander and Walker (Ann Arbor). 3♂, 1♀ (lectotype and paratypes of *tibialis*), Southern Pines, N. C., June 11, 1919, June 15, 1911, June 20, 1906, and June 27, 1912, A. H. Manee (Cambridge). ♀, Horry County, S. C., July 9, 1932, H. Townes (Townes).

This subspecies occurs in the Austroriparian fauna of North Carolina, South Carolina, and southward into Florida.

7b. *Ceropales bipunctata bipunctata* Say

Ceropales bipunctata Say, 1824, *in* Keating, Narrative of an expedition to the source of St. Peter's River . . . , vol. 2 (appendix), p. 334 (Leconte edition, vol. 1, p. 225). ♂, ♀. Types: ♂, ♀, United States (destroyed).

Black. Male with face, clypeus, labrum, lower lateral part of frons, antennal tubercle, spot on under side of scape and of pedicel, narrow band on hind margin of pronotum (sometimes interrupted medially), sometimes a spot on scutellum, and small spot above hind coxa, cream colored. Female with frontal orbit, sometimes an adjacent lateral spot on clypeus, a small spot above hind coxa, and line on under side of scape, cream colored. Both sexes with wings black and hind femur rufous, narrowly black at the base and apex.

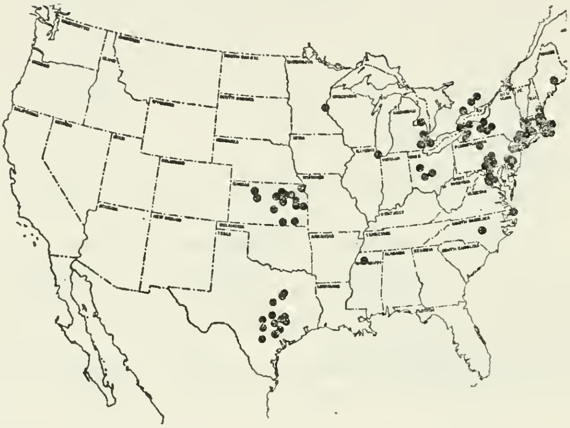


FIGURE 154.—Localities for *Ceropales bipunctata bipunctata*.

SPECIMENS (92♂, 130♀): From Connecticut (East Haddom, East Hartford, and New Haven); Illinois (Chicago); Indiana; Kansas (Baldwin, Cowley County, Dickinson County, Franklin County, Leavenworth, Linn County, Manhattan, Medora, Montgomery County, Morris County, Randolph, Rooks County, Russell County, and Topeka); Maine (Bangor); Massachusetts (Boston, Bourne, Cambridge, Cummington, Dennis, Forest Hills, Framingham, Lexington, Martha's Vineyard, Mount Tom, Nantucket, Natick, Plymouth, Provincetown, Wareham, and Wellesley); Michigan (Oakland County, Port Austin, and Wayne County); Minnesota (Chisago County); Mississippi (Oxford); Missouri; New Brunswick (Shippigan and Tracadie); New Hampshire (Pelham); New Jersey (Gloucester and Riverton); New York (Clifton Springs, Cold Spring Harbor, Freeville, Ithaca, Oswego, Otto, Poughkeepsie, Staten Island, West Point, and Wilson); North Carolina (Kill Devil Hills and Raleigh); Ohio (Columbus, Logan County, and West Jefferson in Franklin County); Ontario (Chatham, Grimsby, Ottawa, and Toronto); Pennsylvania (Camphill, Castle Rock, East Troy, Eberlys Mill, Harrisburg, Mount Holly Springs, New Cumberland, Philadephia, and West Fairview); Prince Edward Island (Brackley Beach in the Canadian National Park); Quebec (Hemmingford, Hull, and Rigaud); Texas (Bexar County, Burleson County, College Station, Cypress Mills, Dallas, Fedor, Giddings, Hunt County, Liberty Hill, Victoria, Waco, and Wolfe City); and Virginia (Arlington, Falls Church, and Glencarlyn).

Most dates of collection are in August and September, a few in July and in the first half of October, and some scattered records earlier in the season. Records outside of July, August, and September are: Apr. 16 and 19 at Columbus, Ohio; May 16 at Victoria, Tex.; May 20 in Hunt County and at Wolfe City, Tex.; May 28 at Liberty Hill, Tex.; June 4 at Riverton, N. J.; June 8 in Riley County, Kans.; June 25 at Baldwin, Kans.; June 26 at Leavenworth, Kans.; Oct. 6 at New Haven, Conn.; Oct. 10 in Brazos County, Tex., and at Arlington, Va.; Oct. 11 at Castle Rock, Pa.; and Oct. 17 at Raleigh, N. C. The seasonal data indicates a single annual generation over most of the range, and two in Texas. Flower records comprise *Ampelopsis arborea* (three collections), *Euphorbia marginata*, *Stillingia sylvatica*, *Polytaenia nuttallii*, *Aster paniculatus*, and *Solidago* spp. (five collections).

This subspecies occurs in the Alleghenian and Carolinian faunas. Adults fly mostly in August and September. They are commonly collected on *Solidago* flowers.

FEMORALIS GROUP

Forewing 2.5 to 5.7 mm. long; head large; abdomen small; antenna short and stout; femora rather stout and flattened; longer hairs of frons reclined, long, and conspicuous; longer hairs on mesoscutum long and conspicuous; second to fourth segments of fore and middle tarsi of male not unusually short, the second segment of the middle tarsus distinctly longer than wide; last segment of fore tarsus of male with a subapical swelling on the front side; claws on fore and middle tarsi of male with a large, appressed, obliquely truncate tooth, the tooth postmedian on the claws of the middle tarsus and on the hind claw of the front tarsus, and shorter, more pointed, and subbasal on the front claw of the front tarsus; claws on fore and middle tarsi of female with a large, appressed, obliquely truncate, postmedian tooth; male subgenital plate small, elongate with a rounded apex, the lateral edges turned up; female subgenital plate in profile rather triangular with a pointed apex, sometimes with only a suggestion of a projecting apical part; seventh tergite of male very convex and enclosing the terminalia and cerci.

This group includes the Nearctic *femoralis*, *hatoda*, *rugata*, and *pacifica*, and the Mexican *C. mexicana* Cresson, 1869. The species *femoralis* occurs south to Panamá. The size, color, and structure of these five are so uniform that without close observation all might pass as a single species.

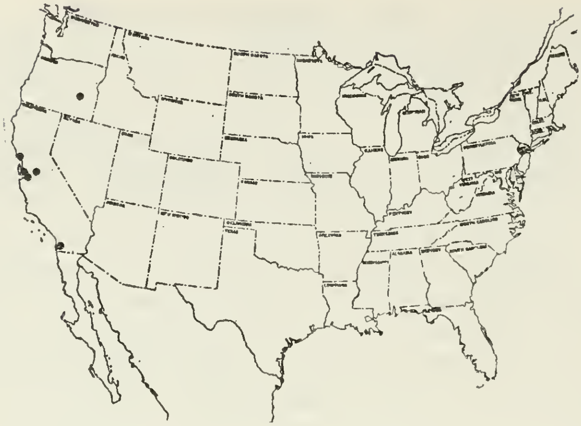


Figure 155.—Localities for *Ceropales pacifica.*

8. *Ceropales pacifica*, new species

Forewing 4.4 to 5.7 mm. long; second flagellar segment about 1.6 as long as wide; frons dull, with small close punctures and scattered larger punctures, diameters of which are about 2 to 3 times as great as those of the smaller punctures; longer hairs on frons about 1.0 as long as the diameter of an ocellus; mesopleuron with medium sized, deep punctures that are separated by about 2.5 their diameter; male subgenital plate broadly lanceolate but upcurved on the sides so as to appear narrower; female subgenital plate distinctly longer than in the other species of the *femoralis* group.

Colored as in *C. rugata* except that the white markings average smaller (or some of the smaller ones lacking entirely), that the longer hairs of the head and thorax are dark brown, and that the front and middle femora and tibiae are more or less infuscate.

Type: ♂, Marin County, Calif., July 1925, F. X. Williams (San Francisco).

Paratypes: ♀, Palo Alto, Calif., Oct. 25, 1894 (Cambridge). ♂, San Diego, Calif., July 8, 1886, Blaisdell (San Francisco). ♂, San Jose, Calif., Aug. 10, 1898, Patterson (Townes). ♀, Tracy, Calif., Aug. 1, 1949, J. W. MacSwain (Townes). ♂, ♀, Austin, 4,000 ft., Oreg., Aug. 11, 1929, H. A. Scullen (Berkeley and St. Paul).

This species occurs in Oregon and California.

9. *Ceropales rugata*, new species

Forewing 2.5 to 5.0 mm. long; second flagellar segment about 1.3 as long as wide; frons subshining, with very small punctures and scattered larger punctures whose diameters are about 2.0 to 3.0 as great as those of the smaller punctures; longer hairs on frons about 1.2 as long as the diameter of an ocellus; mesopleuron with large deep punctures that are separated by about 1.2 their diameter; male subgenital plate ligulate, a little broader apically than in *C. hatoda* and *C. femoralis*, its edges upcurved (in dried specimens there are a pair of longitudinal folds that weakly converge apically and may unite as a single median carina before the apex of the subgenital plate); female subgenital plate triangular in side view, shorter than in *C. pacifica* and a little longer than in *C. hatoda*.

Black. Longer hairs of head and thorax light brown; apical 0.4 of mandible ferruginous; orbits (broadly interrupted above and usually also behind), variable areas on the clypeus ranging from an apicolateral spot to the entire clypeus, tubercle between the antennae, apical triangular area on underside of scape, small spot on underside of pedicel, hind margin of pronotum, an anterior spot on pronotum, usually the lower corner of pronotum, more or less of the front of front coxa, usually a small spot on apex of front femur behind and a similar spot on apex of middle femur in front, usually small dorsal subbasal and subapical spots on fore and middle tibiae, an apical external stripe on middle and hind coxae, rarely a small spot on the scutellum, the postscutellum, a weakly curved lateral apical stripe (broadly separated medially from the stripe on the other side of the tergite) on each of tergites 1 to 4, often an obsolescent narrow apical sublateral spot on the fifth tergite, and a large dorsal spot on the last tergite, creamy white; legs beyond coxae fulvous, the trochanters strongly infuscate and the tarsi weakly infuscate; flagellum tinged with fulvous beneath, especially in the female; maxillary palpi and tegula fulvous with often some infuscation; wings hyaline, a little infuscate apically. In males the front and middle femora may be infuscate and the clypeus sometimes entirely black.

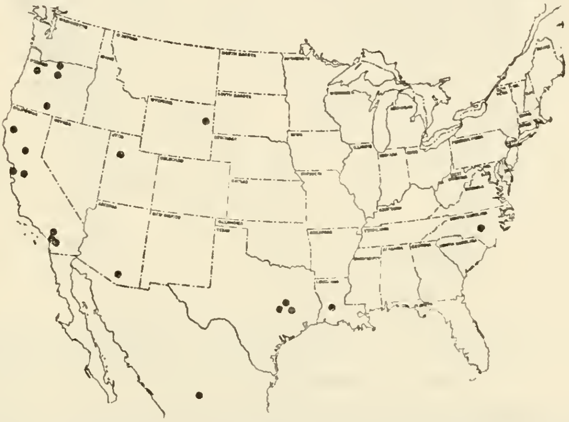


FIGURE 156.—Localities for *Ceropales rugata*.

TYPE: ♂, Corvallis, Oreg., Sept. 15, 1907, J. C. Bridwell (Washington, USNM 61711).

PARATYPES (28♂, 45♀): From California (Claremont, Davis, Geyserville, Laguna Beach, La Jolla, Redwood City, and Tracy); Louisiana (Opelousas); North Carolina (Raleigh); Oregon (Corvallis, Shaniko, 10 miles south of The Dalles, and Summer Lake in Lake County); Texas (Brazos County, Fedor, and Willis); Utah (Skull Valley); Virginia; Wyoming (Weston County); and México (Teotihuacán in "Pyr." and 15 km. east of Sombrerete in Zacatecas).

Collection dates are rather evenly distributed from June 15 to Sept. 15, except that eight of the nine Texas collections are from May 7 to June 6. Two females were taken at Raleigh, N. C., at extrafloral nectaries of *Cassia nictitans*.

This species is known from Oregon, California, Wyoming, Utah, the Gulf and South Atlantic States, and México.

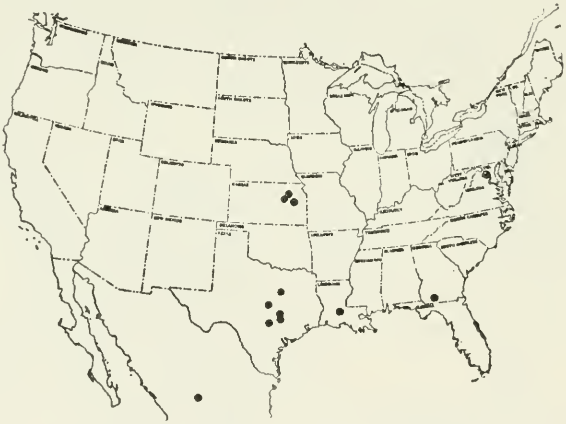


FIGURE 157.—Localities for *Ceropales femoralis*.

10. *Ceropales femoralis* Cresson

Ceropales femoralis Cresson, 1869, Proc. Boston Soc. Nat. Hist., vol. 12, p. 378, "♀"=♂. Type: ♂, Orizaba, México (Philadelphia).

Ceropales foxii, Rohwer, 1916, Canadian Ent., vol. 48, p. 369, ♂. Type: ♂, East Falls Church, Va. (Washington).

Forewing 3.0 to 5.5 mm. long; second flagellar segment about 1.2 as long as wide; frons with dense, sharp, moderately small punctures and scattered, inconspicuous, larger punctures whose diameters are about 1.2 to 1.5 as great as those of the smaller punctures; longer hairs on frons about 1.3 as long as a male ocellus or 1.5 as long as a female ocellus; punctures on upper half of mesopleuron rather large and deep, separated by about 1.3 their diameter; punctures on lower half of mesopleuron medium sized, deep, separated by about 3 to 4 times their diameter; male subgenital plate ligulate, narrowed to a rounded apex, its sides upcurved; female subgenital plate triangular in side view, shorter than in *C. pacifica* and a little longer than in *C. hatoda*.

Coloration as in *C. rugata* except that there is usually a small white spot on the scutellum and that the tibial spurs are a little paler.

Specimens (19♂, 11♀): From Georgia (Bainbridge); Kansas (Baldwin, Manhattan, and Pottawatomie County); Louisiana (Opelousas); Texas (Fedor, "Neuecest," New Braunfels, Rosser, and Williamson County); Virginia (Falls Church); México (15 km. east of Sombrerete in Zacatecas); and Panamá (La Chorrera).

Dates of capture range from Apr. 12 at La Chorrera, Panamá, and Apr. 28 at "Neuecest," Tex., to Oct. 10 in Williamson County, Tex.

This species occurs from Virginia to Kansas and southward to Panamá.

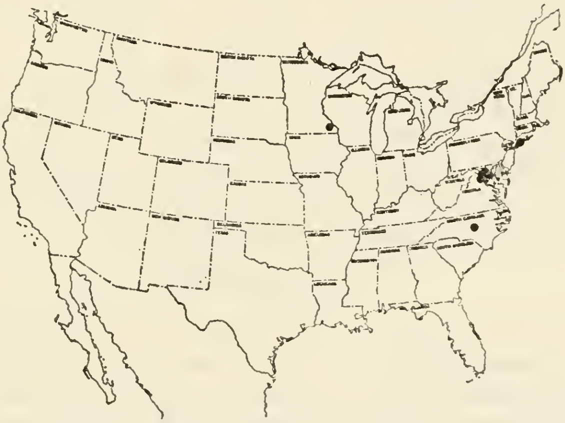


Figure 158.—Localities for *Ceropales hatoda.*

11. *Ceropales hatoda* Brimley

Ceropales hatoda Brimley, 1928, Journ. Elisha Mitchell Sci. Soc., vol. 43, p. 201, ♂. Type: ♂, Raleigh, N. C. (Raleigh).

Forewing 3.3 to 5.2 mm. long; second flagellar segment about 1.35 as long as wide; frons with dense, sharp, moderately small punctures and scattered, inconspicuous, larger punctures whose diameters are about 1.2 to 1.5 as great as those of the smaller punctures; longer hairs on frons about 1.0 as long as the diameter of a male ocellus or 1.5 as long as the diameter of a female ocellus; punctures on upper half of mesopleuron rather large and deep, separated by about 1.6 their diameter; punctures on lower half of mesopleuron a little smaller and separated by 3 to 4 times their diameter; male subgenital plate ligulate, narrowed to a rounded apex, its sides upcurved; female subgenital plate triangular in side view, a little shorter than in *C. femoralis* and *C. rugata.*

Colored as in *C. rugata,* except that the pale markings are a little smaller, that the scutellum usually has a small white spot, and that the legs are black except for the whitish markings described for *C. rugata.*

The tibial spurs are dusky stramineous and the front legs usually tinged with fulvous, especially on the tibia.

Specimens: 4♂, 3♀, from Washington, D. C., July 25, 1948, and Aug. 9, 13, 14, 29, and 31, 1946, M. Vogel (Vogel and Townes). ♂, 2♀, Washington, D. C., June 7, 1947, July 30, 1948, and Sept. 5, 1948, D. Shappirio (Shappirio). ♂, Great Falls (near Washington, D. C.), Md., July 12, N. Banks (Cambridge). ♀, Rochester, Minn., Aug. 23, 1935, C. E. Mickel (St. Paul). ♂, Farmingville, Long Island, N. Y., Aug. 28, 1937, K. V. Krombein (Krombein). ♂, Arlington, Va., Aug. 31, 1947, K. V. Krombein (Krombein). 2♀ trailing on the ground about 2.5 cm. behind a female of *Ageniella partita* (not carrying a spider), Dunn Loring (near Vienna), Va., July 13, 1950, K. V. Krombein (Krombein). 5♂, on *Liriodendron* honeydew, Dunn Loring, Va., Sept. 4, 5, and 11, 1949, K. V. Krombein (Krombein and Townes). 17♂, 4♀, Falls Church, Va., July 12, 14, 16, 21, 22, and 24, and Aug. 2, 6, 9, 20, and 28, N. Banks (Cambridge).

This species has been taken from New York to North Carolina and in Minnesota. *Ageniella partita* appears to be one of its social hosts. Adults are recorded from June 7 to Sept. 11.

FULVIPES GROUP

Forewing 4.5 to 8.5 mm. long; body and legs rather stout; antenna of moderate length; longer hairs of frons suberect, rather short and sparse; longer hairs on mesoscutum short, inconspicuous; second to fourth segments of front and middle tarsi of male very short and broad, the second segment of the middle tarsus not or hardly longer than broad; last segment of fore tarsus of male with a strong, rounded swelling on the front side; tarsal claws of male specialized as follows: front claw of front tarsus with a large triangular lobelike, appressed basal tooth; hind claw of front tarsus with a median appressed lobelike tooth; front claw of middle tarsus with a large lobelike tooth that is strongly appressed to the claw; hind claw of middle tarsus with a large, erect, triangular, subapical tooth. Claws of fore and middle tarsi of female with an acute upright subapical tooth; male subgenital plate triangular, with an acute apical point; female subgenital plate in profile with a projecting apical part, the apex of which is evenly rounded; male cerci vestigial, concealed within the seventh tergite.

This group includes the Nearctic *brevicornis*, *neomexicana*, and *fulvipes*.

12. *Ceropales brevicornis* Patton

Ceropales brevicornis Patton, 1879, Bull. U. S. Geol. Geogr. Surv. Terr. No. 5, p. 368, ♂. Type: ♂, northwestern Kansas (lost).

Forewing 4.5 to 8 mm. long; frons with close, fine punctures and scattered larger punctures that are separated by an average of about

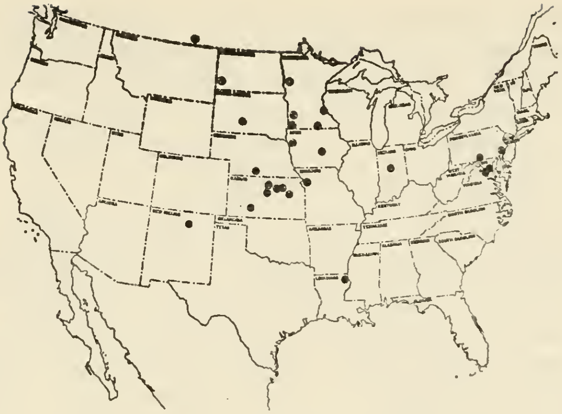


FIGURE 159.—Localities for *Ceropales brevicornis*.

2.0 their diameter; larger punctures on mesoscutum and top of pronotum separated by an average of about 0.7 their diameter; underside of male middle coxa weakly convex, with fine dense oblique pubescence; male hind coxa not or hardly specialized, with a rounded angle between its basal ventral lobe and its hind face; male seventh tergite with a sharp median notch; male subgenital plate not produced or swollen apically.

Blackish. Face, clypeus, labrum, sides of frons, antennal tubercle, narrow posterior orbit, spots on under side of scape and of pedicel, large spot on front callus of pronotum, hind corner of pronotum, tegula, scutellum, postscutellum, sometimes a small longitudinal stripe on mesopleuron above middle coxa, large spot above hind coxa, under side of front coxa, under and front side of middle and hind coxae apically, dorsoanterior stripe on hind coxa that joins the apical mark, elongate apical spot on front femur behind and on middle femur in front, basal and apical spot on front and middle tibia above, dorsal stripe on male front tibia, back side of male front basitarsus, all but apex of male middle basitarsus, large triangular lateral spots on male first tergite that are approximate medially, apical band on female first tergite that is widest laterally and sometimes interrupted medially, apical band on second to fifth tergites of both sexes that is constricted sublaterally, most of median part of sixth tergite, and broad apical margin of male seventh tergite, pale yellow. The face of the female has a median black spot which usually does not reach the clypeus. The labrum of the female may have a black median spot, or have only its sides yellow. The band on the hind margin of the pronotum is medially about as wide as the width of the tegula. Wings hyaline, legs beyond coxae rufous, their trochanters somewhat infuscate basally.

The type of *Ceropales brevicornis* is lost. Fox (1892, Trans. Amer. Ent. Soc., vol. 19, p. 53) reports having seen it but does not clarify its specific identity. The original description fits both the present species and *C. fulvipes*. Since the type locality (northwestern Kansas) is out of the known range of *C. fulvipes* and well within that of the present species, the name is applied here.

Specimens (33 ♂, 24 ♀): From Alberta (Manyberries); District of Columbia (Washington); Illinois ("N. Ill."); Indiana (vicinity of Indianapolis); Iowa (Ames and Sioux City); Kansas (Baldwin, Clay County, Dickinson County, Edwards County, Riley County, and Topeka); Louisiana (Tallulah); Minnesota (Fort Snelling, Luverne, Norman County, Winnebago, and Yellow Medicine County); Montana; Nebraska (Bartley); New Mexico (Las Vegas); North Dakota (Beach); Pennsylvania (Arendtsville and Newtown); South Dakota (Cedar Pass and Phillip); Texas; Virginia (Falls Church); and "Washington Territory" ("Taylors, Wenass V.").

Collection dates are from June 18 to Oct. 7, the earlier and later captures being: June 18 at Ames, Iowa; June 26 at Arendtsville, Pa.; June in Riley County, Kans.; Sept. 15 in Yellow Medicine County, Minn.; Sept. 17 in Riley County, Kans., and at Sioux City, Iowa; and Oct. 7 at Baldwin, Kans. Flower records include *Asclepias pumila* and *Solidago* sp.

This is a widely distributed but uncommon species known from Louisiana, Texas, and New Mexico north to Pennsylvania and Alberta. There is a single record from west of the Rocky Mountains, from "Taylors, Wenass V., Washington Territory, VII–6–82."

13. *Ceropales neomexicana* Rohwer

Ceropales neomexicana Rohwer, 1915, Proc. U. S. Nat. Mus., vol. 49, p. 236, ♂. Type: ♂, northern N. Mex. (Washington).

Forewing 5 to 8 mm. long; underside of male middle coxa weakly concave, with fine, dense, oblique pubescence; male hind coxa below with an overhanging ridge between its ventral and hind faces on its basal half; male seventh tergite with a broad, median apical notch; male subgenital plate a little elongate, in profile somewhat swollen apically. Structure otherwise similar to that of *C. fulvipes*.

Labrum of female black; black mark in middle of face of female reaching the clypeus; postorbital yellow mark broken into an upper and a lower half; trochanters and ground color of front and middle femora blackish or fuscoferruginous. Other markings similar to those of *C. brevicornis*, but the yellow on the body averaging a little less extensive.

Specimens: ♂, Tucson, Ariz., F. H. Snow (Evans). ♂, from light trap, Blythe, Calif., Aug. 15, 1947, J. W. MacSwain (Berkeley). ♂, visiting glandular hairs of *Helianthus anuus*, Imperial County,

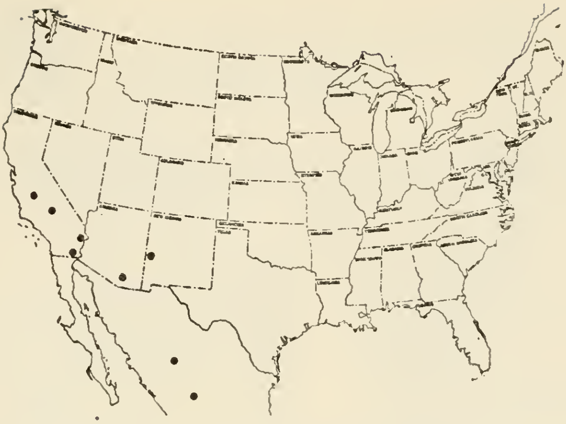


FIGURE 160.—Localities for *Ceropales neomexicana.*

Calif., May 26, 1912, J. C. Bridwell (Washington). 5♂, experiment station farm, Imperial County, Calif., May 1911, May 1912, May 26 and 29, 1912, and June 1912, J. C. Bridwell (Washington). ♂, ♀, Owens River, Calif., Aug. 5, 1915, C. H. Kennedy (Ithaca). ♂, 3♀, Wood Lake, Tulare County, Calif., Apr. 5 and 25, May 26, and June 25, 1947, Norman W. Frazier (Berkeley). ♂, Luna, N. Mex., Aug. 2, 1935, I. J. Cantrall (Ann Arbor). ♂, 15 km. east of Sombrerete, Zacatecas, México, July 28 to 31, 1951, H. E. Evans (Evans). ♀, 11 km. south of Cañutillo, Durango, México, Aug. 9, 1951, P. D. Hurd (Berkeley).

This species occurs in the Lower Sonoran fauna.

14. *Ceropales fulvipes* Cresson

Ceropales fulvipes Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 208, ♀. Lectotype: ♀, Texas (Philadelphia).

Forewing 4.5 to 8.7 mm. long; frons with weak, very fine punctures and scattered larger weak punctures that are separated by an average of about 4.0 their diameter; larger punctures on mesoscutum and top of pronotum separated by an average of about 1.5 their diameter; underside of male middle coxa weakly concave, with fine dense suberect pubescence; male hind coxa with a large, internal, basal, obliquely truncate lobe that subtends a large excavated area on the basal part of the hind face of the coxa (in smaller specimens this lobe is shorter and more rounded); male seventh tergite with a weak median apical notch; male subgenital plate somewhat elongate, in profile with a strong apical swelling.

Black. Labrum of female pale yellow, black, or black with pale yellow lateral corners; black mark in middle of face of female reaching the clypeus; underside of flagellum of male rufous; trochanters and

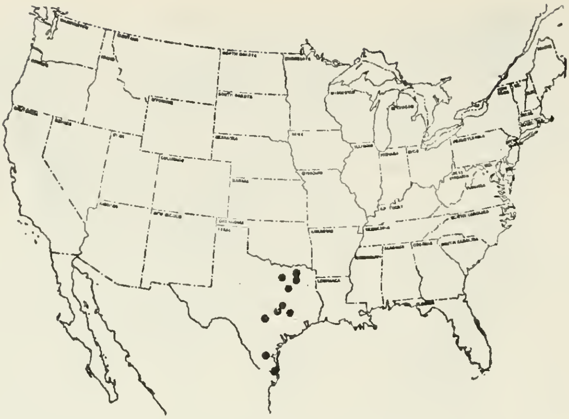


FIGURE 161.—Localities for *Ceropales fulvipes.*

often apical part of coxae rufous. The band on the hind margin of the pronotum is medially about 1.2 as wide as the tegula. Other markings similar to those of *C. brevicornis.*

SPECIMENS (21♂, 14♀): From Texas (Brazos County, Brownsville, Caldwell County, Dallas, Denton, Fedor, Hunt County, Ladonia, New Braunfels, San Diego, and Shiloh).

Collecting dates are from Apr. 18 to June 6 and July 21 to Oct. 10. Flower records comprise *Polytaenia nuttallii, Daucus carota,* and *Solidago* sp.

This species is widespread in Texas.

Index

[Page numbers of principal entries and names of new genera and species in *italics*. For index of hosts and prey, see page 285.]

A

abbreviatus, Priocnemis (Priocnemis), 91, *102* (map)
accepta, Ageniella (Ageniella), 190, 191, 209, 210, 212, *213*, 214 (map)
acceptus, Pompilus (Agenia), 189, 213
accolens, Pompilus (Agenia) calcaratus, 113, 114
adara, Ageniella, 213
adele, Ameragenia, 177
Adirostes, 68
  tolteca, 68
adjunctus, Auplopus, 145, 146, *150* (map)
adjusta, Pseudagenia mellipes, 150
Adonta, 68
aequalis, Ageniella, 96
  Priocnemis (Priocnemis), 90, 91, *96*, 97 (map)
Agenia, 116
  argenteosignata, 198
  belfragei, 22
  caerulescens, 160
  euphorbiae, 201
  fulvipes, 144, 152
  hirsutula, 11
  longa, 175
  macula, 141
  minuscula, 101
  perfecta, 235
  rufigastra, 227, 228
  variitarsata, 154
  xanthopus, 81
Ageniella, 140, 167 (key), 177, *189*, 190 (key), 198, 216
  (Ageniella) accepta, 190, 191, 209, 210, 212, *213*, 214 (map)
  accepta conflicta, 210
  adara, 213
  aequalis, 96
  (Priophanes) agenioides, 177, 178, *186* (map), 189
  alternata, 216
  aludra, 99
  amoena, 219
  annecta, 141
  (Priophanes) arcuata, 177, 178, *187* (map), 189
  (Ageniella) argenteosignatus, 189
  (Priophanes) arizonica, *178* (map)
  (Priophanes) arizonica arizonica, 177, 178 (map), *179*
  (Priophanes) arizonica *concolor*, 177, 178, *179* (map)
Ageniella—Continued
  bequaerti, 219
  (Ageniella) blaisdelli, 190, 191, 210, *212* (map)
  caloptera, 219
  clypeata, 231
  (Ageniella) conflicta, 190, 191, *210*, 211 (map), 212, 214
  coronata, 209
  (Ageniella) coronata, 190, 192, 208, *209* (map), 210
  crassicornis, 97
  (Ageniella) cupida, 190, 191, 192, 198, *203*, 204 (map), 205
  cupidella, 206
  delicata, 200
  delila, 219
  (Ageniella) euphorbiae, 191, 192, 198, *201* (map), 205
  (Ageniella) *evansi*, 190, 193, 198, *205* (map)
  eximia, 99
  (Priophanes) faceta, 177, *181*
  (Priophanes) faceta faceta, 177, 178, *181*, 182 (map), 183
  (Priophanes) faceta *ventralis*, 177, 178, *183* (map)
  (Ameragenia) *fasciata*, 215, 216, *217* (map)
  festina, 170
  fraternella, 170
  (Leucophrus) fulgifrons, 169, *173* (map)
  (Priophanes) *fuscipennis*, 177, 178, *188*, 189 (map)
  (Ageniella) *grisea*, 190, 192, 193, *195* (map)
  hestia, 97
  (Leucophrus) incita, 169, *172* (map)
  isolata, 219
  julia, 234
  (Nemagenia) longula, *175* (map)
  maya, 210
  mintaka, 197
  (Ageniella) mintaka, 190, 191, *197* (map)
  neglecta, 208
  (Ageniella) neglecta, 190, 191, 198, *207*, 208 (map)
  norata, 206
  (Ageniella) norata, 190, 192, 198, *206* (map)
  obscura, 199

- Ageniella—Continued
  - (Ageniella) obscura, 191, 192, *198*
  - (Ageniella) obscura delicata, 191, 192, *200* (map)
  - (Ageniella) obscura obscura, 191, 192, *199* (map)
  - pallida, 196
  - (Ageniella) pallida, 190, 192, *195*, 196 (map)
  - partita, 193
  - (Ageniella) partita, 190, 192, *193* (map)
  - persimilis, 210
  - (Priophanes) placita, 177, 178, *184*
  - (Priophanes) placita placita, 177, 178, *184* (map)
  - (Priophanes) placita *sonorensis*, 177, 178, *185* (map)
  - praestans, 212
  - purpuripes, 198
  - restricta, 200
  - (Leucophrus) reynoldsi, 169, *171* (map)
  - (Priophanes) rufescens, 178, *180* (map)
  - rufothorax, 219
  - rufula, 219, 220
  - (Ameragenia) salti, 215, 216, *218* (map)
  - (Ageniella) *seminole*, 190, 192, *196* (map)
  - (Leucophrus) semitincta, 169, *170* (map)
  - (Ameragenia) *striga*, 215, *216* (map)
  - subaequalis, 201
  - (Ageniella) submetallica, 190, 193, 198, *205* (map)
  - subra, 186
  - tenella, 94
  - (Ageniella) *vogeli*, 191, 192, 198, *202* (map)
- agenioides, Ageniella (Priophanes), 177, 178, *186* (map), 189
  - Priocnemis, 186
- Agenioxenus, 238
- agilis, Ceropales, 250
  - Pompilus (Agenia), 173
- Agriogenia, 131
- Alasagenia rubineus, 193, 194
- *alaskensis* Priocnemis (Priocnemis) notha, 91, *106*, 107 (map)
- alastor, Dipogon, 132
- albopicta, Ceropales, 250
  - Ceropales cubensis, 240, *250*, 251 (map)
- albopilosus, Chirodamus, 13, *14*, 15 (map), 16, 18
  - Pompilus (Agenia), 14
- alienatus, Calicurgus hyalinatus, 109, 110, *111*, 112 (map), 113, 114
  - Pompilus, 111
- alternata, Ageniella, 216
- aludra, Ageniella, 99
- Ameragenia, 167, 168, *215*, 216 (key)
  - adele, 177
  - cleora, 215
- Ameragenia—Continued
  - dolorosa, 215
  - fabricii, 215
  - festina, 215
  - incrota, 215
  - irene, 215
  - notabilis, 215
  - partida, 215
  - pretiosa, 215
  - similaris, 215
  - thione, 215
- Amerocnemis, 40
  - bequaerti, 40
- amoena, Ageniella, 219
- Anacyphonyx, 11
  - fidelis, 11
  - metallica, 12
  - rosasi, 12
- anconis, Pseudagenia, 215
- andicolus, Calicurgus, 108
- *angusticeps*, Priocnemioides, 51, 58, *60* (map), 64
- angustimarginata, Pepsis, 26, 28, *29*
- annecta, Ageniella, 141
- annulata, Sphex, 67
- anomalus, Dipogon, 121
  - Dipogon (Deuteragenia) papago, 117, *121* (map), 123
- Anoplius, 116
  - variegatus, 116
- antennalis, Pseudagenia, 159
- Aoplopus, 143
- apache, Priocnessus, 40, *46* (map), 49
  - Priocnemis (Priocnessus), 46
- apicipennis, Pseudagenia, 184, 185
- apogona, Haploneura, 81
- Aporus, 6
- aquila, Pepsis, 27, *30*
- *aquilonia*, Ceropales elegans, 240, *256*, 257 (map), 258
- *aratus*, Priocnemioides, 50, *51*, 52 (map)
- architectus, Auplopus, 145, 146, 147, 157, 159, *161*, 162, 166
  - Auplopus architectus, 146, 147, 162, *163*, 164 (map)
  - Pompilus, 163
- arcuata, Ageniella (Priophanes), 177, 178, *187* (map), 189
- arcuatus, Cryptocheilus, 187
- argenteosignata, Agenia, 198
- argenteosignatus, Ageniella (Ageniella), 189
- ariel, Dipogon, 132
  - Priocnemis (Calicurgus), 108
- ariella, Pseudagenia, 159
- arioles, Priocnemis, 176
- arizonica, Ageniella (Priophanes), *178* (map)
  - Ageniella (Priophanes) arizonica, 177, 178 (map), *179*
  - Pepsis, 27, *30*
  - Priocnemis, 179
  - Cryptocheilus, 76
- *arizonicus*, Notocyphus dorsalis, 222, *223* (map), 225
- ascensi, Cryptocheilus (Tetracryptocheilus), 32
- astarte, Priocnemis (Clistoderes), 83

- atratus, Cryptocheilus, 70
- *atratus*, Dipogon (Dipogon) graenicheri, 131, *139* (map)
- *atripennis*, Priocnemioides texanus, 50, *56* (map), 57
- attenuatum, Cryptocheilus, 68, 69, *75* (map)
- attenuatus, Cryptocheilus, 75
- Auplopus, 140, 141, *143*, 145 (key), 166
  - adjunctus, 145, 146, *150* (map)
  - architectus, 145, 146, 147, 157, 159, *161*, 162, 166
  - architectus architectus, 146, 147, 162, *163*, 164 (map)
  - architectus metallicus, 146, 147, *162* (map)
  - caerulescens, 145, 146, 147, *157*, 159, 162, 163, 166
  - caerulescens caerulescens, 146, 147, *160* (map)
  - caerulescens floridanus, 146, 147, 159, *161*, (map)
  - caerulescens subcorticalis, 146, 147, *158*, 159 (map)
  - flavicoxae, 145, 146, *147*
  - *inermis*, 145, 146, *148* (map)
  - mellipes, 144, 145, 146, *151*
  - mellipes *meridianus*, 145 146, *154* (map)
  - mellipes mellipes, 144, 145, 146, *152* (map)
  - mellipes variitarsatus 145, 146, 153, *154*, 155 (map)
  - mexicanus, 145, 146, *156* (map)
  - *mollis*, 145, 147, *157* (map)
  - nigrellus, 145, 146, 147, 158, 162, 163, *165* (map)
  - *variolarum*, 145, 146, *149* (map)
- austrianus, Cryptocheilus, 54
  - Priocnemioides, 50, 51, *53*
  - Priocnemioides austrinus, 51, *54* (map)
- azteca, Pepsis, 26, 28, *29*

B

- barbara, Pallosoma, 32
- belfragei, Agenia, 22
- bequaerti, Ageniella, 219
  - Amerocnemis, 40
  - Pepsis, 31
- bipunctata, Ceropales, 249, 260, 262
  - Ceropales bipunctata, 240, *262* (map)
- birkmanni, Cryptocheilus, 68
  - Cryptocheilus idoneum, 68, 69, *79* (map)
  - Pseudagenia, 187
- blaisdelli, Ageniella (Ageniella), 190, 191, 210, *212* (map)
  - Pseudagenia, 212
- Boguei, Pepsis, 29
- bombycina, Phanagenia, *141*, 142 (map)
- bombycinus, Pompilus (Agenia), 141
- Bonariensis, Pepsis, 66, 67
- borealis, Calicurgus hyalinatus, 109, *110* (map), 111, 112, 113
  - Priocnemis alienatus, 110
- brazoria, Onochares, 11, 22
- Brethesia, 25
- brevicornis, Ceropales, 139, *268*, 269 (map), 270, 272
  - Pseudagenia (Minagenia), 226
- brevis, Dipogon (Dipogon), 131, *132*, 133, *134*, 137
  - Dipogon (Dipogon) brevis, 131, 132, 135, 136 (map), 137
  - Pompilus (Agenia), 131, 135
- bruesi, Pseudagenia, 198

C

- *caenosa*, Ceropales maculata, 239, *242* (map), 245, 247
- caerulescens, Agenia, 160
  - Auplopus, 145, 146, 147, *157*, 159, 162, 163, 166
  - Auplopus caerulescens, 146, 147, *160* (map)
- Calagenia, 143
  - hermosa, 143
- calcaratus, Pompilus (Agenia), 111
- Caliadurgus, 108
- Calicurgus, 9, 11, *108*
  - andicolus, 108
  - hyalinatus, 108, *109* (key)
  - hyalinatus alienatus, 109, 110, *111*, 112 (map), 113, 114
  - hyalinatus borealis, 109, *110* (map), 111, 112, 113
  - hyalinatus *excoctus*, 109 *114*, 115 (map)
  - hyalinatus hyalinatus, 109, 110
  - hyalinatus rupex, 109, 110, *113*, 114 (map)
  - jocaste, 108
  - loranthe, 108
  - luteicornis, 66
  - marginatus, 108
  - orijones, 108
  - propinquus, 89
  - quitus, 108
  - rufigaster, 108
  - vulgaris, 84
- *californicus*, Priocnemioides unifasciatus, 51, 62, *65* (map, 66
- calipterus, Dipogon (Deuteragenia), 117, 118, *123*, 126, 127
  - Dipogon (Deuteragenia) calipterus, 118, *124* (map)
  - Pompilus, 124
- Calopompilus, 11
  - erebus, 12
  - fraternus, 12
  - helas, 12
  - parvulus, 12
- caloptera, Ageniella, 219
- capensis, Hemipepsis, 32
- carbonarius, Sphex, 143
- carinatus, Cryptocheilus, 72
- carinigena, Schizagenia, 143
- Ceratopales, 238
- cerberus, Pepsis, 30
  - Pepsis elegans, 26, 27, *30*
- Ceropales, *238* (key), 249
  - agilis, 250

- Ceropales—Continued
  - albopicta, 250
  - bipunctata, 249, *260*, 262
  - bipunctata bipunctata, 240, *262* (map)
  - bipunctata tibialis, 240, *261* (map)
  - brevicornis, 139 *268*, 269 (map), 270, 272
  - cressoni, 257
  - cubensis, 240, *249*, 251
  - cubensis albopicta, 240, *250*, 251 (map)
  - cubensis cubensis, 240, *251*
  - elegans, 240, 249, *256*, 257
  - elegans *aquilonia*, 240, *256*, 257 (map), 258
  - elegans elegans, 240, *257*, 258 (map)
  - elegans quaintancei, 240, 257, *258*, 259 (map)
  - fasciata, 252
  - femoralis, 241, 249, *263*, 264, 265, *266* (map) 267
  - floridensis, 261
  - foxii, 266
  - fraterna, 244
  - fraternus occidentalis, 244
  - frigida, 252
  - fulvipes, 239, 249, *268*, *270*, *271*, 272 (map)
  - hatoda, 194, 241, 263, 265, 266, *267* (map)
  - longipes, 240, 249, 252 (map)
  - maculata, 239, *241*, 244
  - maculata *caenosa*, 239, *242* (map), 245, 247
  - maculata fraterna, 239, 243, *244*, 245 (map), 247, 248
  - maculata maculata, 239, *241*
  - maculata *rhodomerus*, 139, *243* (map), 245, 247
  - maculata stretchii, 139, 245, *247*, 248 (map)
  - mexicana, 263
  - minima, 244
  - neomexicana, 239, 268, *270*, 271 (map)
  - nigripes, 240, 249, *259*, 260 (map)
  - *pacifica*, 240, 241, 263, *264* (map), 266
  - quaintancei, 258
  - robinsoni stigmatica, 255
  - robinsonii, 238, *248*, *253*
  - robinsonii robinsonii, 240, *253*, 254 (map), 256
  - robinsonii stigmatica, 240, *255* (map)
  - rufiventris, 238, 253, 255
  - *rugata*, 240, 241, 263, *264*, 265 (map), 267
  - stretchii, 247
  - superba, 254
  - texana, 259
- Ceropalinae, 6, 8, *220*, 221 (key)
- Ceropalini, 221, *237*
- Cheilotus, 49
- Chilochares, 68
- Chirodamus, 9, 10, *11*, 12 (key)
  - albopilosus, 13, *14*, 15 (map), 16, 18
  - deceptus, 13, 14, *17* (map), 18
  - feroculis, 13, 14, 17, *23* (map)
  - fortis, 13, 14, *15*, 16 (map)
  - heiligbrodtii, 13, 14, 17, 18, *21*, 22 (map)
  - kingii, 11
  - maculipennis, 13, 14, 17, *20* (map)
  - pyrrhomelas, 13, 14, 17, *18*, 19 (map)
  - validus, 13, 14, 17, 23, *24* (map)
- christophei, Priocnemis, 108
- Chrysocurgus, 11
- chrysothemis, Pepsis, 27, 28, *31*, 32
  - Pepsis chrysothemis, 27, 28, *32*
- cincticornis, Pompilus (Priocnemis), 40
- cinnabarina, Pepsis, 32
- Cirripepsis, 25
- Claveliinae, 6
- cleora, Ameragenia, 215
- Clistoderes, 81, *83*
- clypeata, Ageniella, 231
  - Minagenia, 227, *231* (map), 233
- coerulescens, Pseudagenia, 160
- coloradensis, Cryptocheilus, 45
  - Priocnessus, 41, *45* (map), 49
- comes, Priophanes, 177
- commixta, Hemipepsis, 33
- Hemipepsis (Xenopepsis), 32
- comparatus, Pompilus, 87
- *concolor*, Ageniella (Priophanes) arizonica, 177, 178, *179* (map)
- conflicta, Ageniella (Ageniella), 190, 191, *210*, 211 (map), 212, 214
  - Ageniella accepta, 210
- congrua, Minagenia, *227*, 228 (map)
- congruus, Pompilus (Agenia), 227
- conicus, Pompilus (Miscus), 99
  - Priocnemis, 84
- coriaceus, Priocnemis, 83
- "coriarius," Priocnemis, 83
- cornica, Priocnemis (Priocnemis), 90, 91, *99* (map)
- cornicus, Pompilus (Miscus), 99
- coronata, Ageniella, 209
- coronata, Ageniella (Ageniella), 190, 192, 208, *209* (map), 210
- crassicornis, Ageniella, 97
- Cressochilus, 40
- cressoni, Ceropales, 257
  - Cryptocheilus, 63, 65
  - Mygnimia, 35, 36
  - Priocnemioides unifasciatus, 51, 60, 62, *63*, 64 (map), 65, 66
- croesus, Hemipepsis (Moropepsis), 32
- Cryptocheilus, 9, 11, 38, 50, 51, *67*, 68 (key), 70, 73
  - arcuatus, 187
  - arizonicus, 76
  - (Tetracryptocheilus) ascensi, 32
  - atratus, 70
  - attenuatum, 68, 69, *75* (map)
  - attenuatus, 75
  - austrinus, 54
  - birkmanni, 68
  - carinatus, 72
  - coloradensis, 45

- Cryptocheilus—Continued
  - cressoni, 63, 65
  - flammipennis, 63, 65
  - hesperus, 69, *70* (map)
  - idoneum, 69, 71, *78*
  - idoneum birkmanni, 68, 69, *79* (map)
  - idoneum idoneum, 69, *78* (map)
  - idoneus, 78
  - inaequalis, 18
  - incitus, 172
  - manni, 12
  - paeneparcus, 107
  - pallescens, 181
  - pallidipenne, 68, 69, *74* (map)
  - peruvianus, 67
  - placitus, 184, 185
  - rugosus, 18
  - severini, 6, 7 (fig.), 69, *76* (map)
  - terminatum, 69, 70, *71*
  - terminatum subopacum, 69, *72* (map)
  - terminatum terminatum, 69, *72*, 73 (map)
- Cryptochilus, 68
- cubensis, Ceropales, 240, *249*, 251
  - Ceropales cubensis, 240, *251*
- cupida, Ageniella (Ageniella), 190, 191, 192, 198, *203*, 204 (map), 205
- cupidella, Ageniella, 206
- cupidus, Pompilus (Agenia), 203
- Cyphononyx, 9

D

- dakota, Pompilus (Agenia), 44
  - Priocnessus, 41, *44* (map), 49
- deceptus, Chirodamus, 13, 14, *17* (map), 18
- delicata, Ageniella, 200
  - Ageniella (Ageniella) obscura, 191, 192, *200* (map)
- delila, Ageniella, 219
- Derochilus, 11
- Deropepsis, 25
- Deuteragenia, 115, *116* (key), 117 (key)
  - papago, 120
  - pilosa, 124
- dimidiata, Pepsis, 25
- Dinocnemis, 11
- Dinopepsis, 25
- Dipogon, 9, 10, *115*, 116 (key), 131 (key)
  - alastor, 132
  - anomalus, 121
  - ariel, 132
  - (Dipogon) brevis, 131, 132, 133, *134*, 137
  - (Dipogon) brevis brevis, 131, 132, *135*, 136 (map), 137
  - (Dipogon) brevis *ochreus*, 132, *137* (map)
  - (Dipogon) brevis *recalvus*, 131, 132, *134* (map), 137
  - (Deuteragenia) calipterus, 117, 118, *123*, 126, 127
  - (Deuteragenia) calipterus calipterus, 118, *124* (map)
- Dipogon—Continued
  - (Deuteragenia) calipterus *duplicatus*, 116, 118, 124, *125* (map)
  - (Deuteragenia) calipterus nubifer, 118, *125* (map)
  - femur-aureus, 124
  - graenicheri, 139
  - (Dipogon) graenicheri, 131, 132, *138*
  - (Dipogon) graenicheri *atratus*, 131, *139* (map)
  - (Dipogon) graenicheri graenicheri, 131, *139*, (map)
  - (Deuteragenia) *iracundus*, 116, 118, 123, *127* (map)
  - (Dipogon) *paludis*, 132, *133* (map)
  - (Deuteragenia) papago, 117, 118, *119*
  - (Deuteragenia) papago anomalus, 117, *121* (map), 123
  - (Deuteragenia) papago *floridanus*, 117, 121, *122* (map)
  - (Deuteragenia) papago papago, 117, *120* (map)
  - populator, 131
  - (Deuteragenia) pulchripennis, 116, 117, *118*, 119 (map), 120
  - (Dipogon) *pygmaeus*, *132* (map)
  - sayi, 128
  - (Deuteragenia) sayi, 117, 123, *128*
  - (Deuteragenia) sayi *nigrior*, 116, 118, *130* (map)
  - (Deuteragenia) sayi sayi, 118, *128*, 129 (map)
  - sericea, 123, 127
  - (Deuteragenia) sericeus, 116, 117 (key), *127*
  - texanus, 137
  - (Dipogon) texanus, 131, *137*, 138 (map)
  - (Deuteragenia) *thoracicus*, 116, 118, 123, *126* (map)
  - (Deuteragenia) variegatus, 116, 117, *123*
- directa, Priocnemis, 175
- dispertitius, Salius (Priocnemis), 84
- doddsi, Priocnemis (Calicurgus), 108
- dolorosa, Ameragenia, 215
- domingensis, Priocnemella, 198
- dorsalis, Notocyphus, *222* (key), 224
  - Notocyphus dorsalis, 222, 223, *224*, 225 (map)
- dowi, Priocnemis, 176
- dubitata, Pepsis, 30
- dumosus, Pompilus, 67
  - Priocnemioides unifasciatus, 62, *67*
- *duplicatus*, Dipogon (Deuteragenia) calipterus, 116, 118, 124, *125* (map)

E

- elegans, Ceropales, 240, 249, *256*, 257
  - Ceropales elegans, 240, *257*, 258 (map)
  - Pepsis, 26, 27, *29*, 30
  - Pepsis elegans, 26, 27, *30*
- Eragenia, 219
  - infelix, 219
- Evania maculata, 238, 241

erebus, Calopompilus, 12
erigone, Pseudagenia, 143
eudora, Priophanes, 215
euphorbiae, Agenia, 201
  Ageniella (Ageniella), 191, 192, 198, *201* (map), 205
evansi, Ageniella (Ageniella), 190, 193, 198, *205* (map)
exaltata, Sphex, 89
  Priocnemis, 89
excoctus, Calicurgus hyalinatus, 109, *114*, 115 (map)
eximia, Ageniella, 99
externa, Minagenia, 226, *232* (map)
  Pseudagenia, 226, 232

F

fabricii, Ameragenia, 215
Fabriogenia incompta, 141
faceta, Ageniella (Priophanes), 177, *181*
  Ageniella (Priophanes) faceta, 177, 178, *181*, 182 (map), 183
facetus, Priocnemis, 176, 181
fairchildi, Priocnemis (Priocnemella), 219
fasciata, Ageniella (Ameragenia), 215, 216, *217* (map)
fasciata, Ceropales, 252
fasciatellus, Pompilus, 108
fasciipennis, Salius, 111
fascipennis, Pompilus, 111
femoralis, Ceropales, 241, 249, 263, 264, 265, *266* (map), 267
  Pompilus, 89
femoratus, Pompilus, 143, 144
femur-aureus, Dipogon, 124
feroculis, Chirodamus, 13, 14, 17, *23* (map)
  Pseudagenia, 23
festina, Ageniella, 170
  Ameragenia, 215
fidelis, Anacyphonyx, 11
flammipennis, Cryptocheilus, 63, 65
  Priocnemioides, 58, 64
flavicoxae, Auplopus, 145, 146, *147*
  Pseudagenia mexicana, 147
flavipes, Pompilus, 81
floridanus, Auplopus caerulescens, 146, 147, 159, *161* (map)
floridanus, Dipogon (Deuteragenia) papago, 117, 121, *122* (map)
floridanus, Pseudagenia, 161
floridensis, Ceropales, 261
Formica pallide-fulva, 215
Formicidae, 116, 136
formosa, Pepsis, 5, 26, 27, 28
  Pepsis formosa, 26, 27, *28*
formosus, Pompilus, 28
fortella, Priocnemis, 14
fortis, Chirodamus, 13, 14, *15*, 16 (map)
  Pompilus (Priocnemis), 11, 15
foxii, Ceropales, 266
fraterna, Ceropales, 244
  Ceropales maculata, 239, 243, *244*, 245 (map), 247, 248
fraternella, Ageniella, 170
fraternus, Calopompilus, 12
frigida, Ceropales, 252
frivaldszkyi, Pepsis, 25
fulgidifrons, Salius, 173
fulgifrons, Ageniella (Leucophrus), 169, *173* (map)
  Pompilus (Priocnemis), 173
fulvicornis, Pompilus (Priocnemis), 49, 58
  Priocnemioides, 50, 51, 57, *58* (map), 60
fulvipes, Agenia, 144, 152
  Ceropales, 239, 249, *268*, 270, *271*, 272 (map)
fusca, Sphex, 2, 84
fuscatus, Priocnemioides austrinus, 51, *53* (map), 54
fuscipennis, Ageniella (Priophanes), 177, 178, *188*, 189 (map)

G

germana, Priocnemis (Priocnemis), 90, 91, *92* (map)
germanus, Pompilus (Priocnemis), 92
gigantea, Pepsis, 25
Gigantopepsis, 25
gomelza, Priocnemis, 86
gracilicornis, Psammochares, 78
graenicheri, Dipogon, 139
  Dipogon (Dipogon), 131, 132, *138*
  Dipogon (Dipogon) graenicheri, 131, *139* (map)
gravesii, Pompilus, 81
grisea, Ageniella (Ageniella), 190, 192, 193, *195* (map)
grossa, Pepsis, 25

H

Haploneura, 81
  apogona, 81
Haploneurion, 81
  minus, 82
hatoda, Ceropales, 241, 263, 265, 266, *267* (map)
heiligbrodtii, Chirodamus, 13, 14, 17, 18, *21*, 22 (map)
  Onochares, 11
  Priocnemis, 22
helas, Calomompilus, 12
Hemipepsis, 9, 10, *32*, 33 (key)
  capensis, 32
  commixta, 33
  (Xenopepsis) commixta, 32
  (Moropepsis) croesus, 32
  iodoptera, 38
  mexicana, 33, *38*, 39 (map)
  ochroptera, 34, 37
  ochropus, 38
  toussainti, 33, *34* (map)
  unguicularis, 32
  ustulata, 33, *34*
  ustulata ochroptera, 33, 34, *37* (map), 65
  ustulata ustulata, 33, 34, *35*, 36 (map), 38, 65
Hemipogonius, 90
hermosa, Calagenia, 143

heros, Pepsis, 30
hesperiae, Pepsis, 29
hesperina, Mygnimia, 37
hesperus, Cryptocheilus, 69, 70 (map)
  Priocnemis, 70
hestia, Ageniella, 97
  Priocnemis (Priocnemis), 90, 91, *97*, 98 (map)
hirsuta, Pepsis, 30
hirsutula, Agenia, 11
holonis, Priophanes, 170
Homonotus, 6, 221
Hovagenia, 32
  saussurei, 32
hyalinatus, Calicurgus, 108, *109* (key)
  Calicurgus hyalinatus, 109, 110
  Pompilus, 108
  Sphex, 108
hymenaea, Pepsis, 25
Hypsiceraeus, 238

I

idoneum, Cryptocheilus, 69, 71, *78*
  Cryptocheilus idoneum, 69, *78* (map)
idoneus, Cryptocheilus, 78
ignipennis, Pompilus, 49, 58
impiger, Pompilus (Priocnemis), 108
inaequalis, Cryptocheilus, 18
incita, Ageniella (Leucophrus), 169, *172* (map)
incitus, Cryptocheilus, 172
incompta, Fabriogenia, 141
incrota, Ameragenia, 215
inermis, Auplopus, 145, 146, *148* (map)
inermis, Pepsis, 30
infelix, Eragenia, 219
infernalis, Reedimia, 12
insignis, Lissagenia, 219
insolens, Priophanes, 215
interior, Pseudagenia mellipes, 152
iodoptera, Hemipepsis, 38
iracundus, Dipogon (Deuteragenia), 116 118, 123, *127* (map)
Irenangelus, 6, 238
irene, Ameragenia, 215
iridipennis, Pompilus (Agenia), 92
iris, Tumagenia, 143
isolata, Ageniella, 219

J

jocaste, Calicurgus, 108
julia, Ageniella, 234
  Minagenia, 227, 233, *234* (map)

K

kingii, Chirodamus, 11
kiowa, Priocnemis (Priocnessus), 44

L

lata, Minagenia, 227, *230* (map), 236
leibyi, Priocnemis, 41, 42, 43
Leucophrus, 167, *168*, 169 (key), 174
levipes, Pompilus, 226
limbata, Pepsis, 25
Lissagenia insignis, 219
longa, Agenia, 175
longipes, Ceropales, 240, 249, *252* (map)
longula, Ageniella (Nemagenia), *175* (map)
longulus, Pompilus (Agenia), 174, 175
Lophagenia, 143
loranthe, Calicurgus, 108
lucasii, Pepsis, 32
  Pepsis chrysothemis, 27, 28, *32*
luteicornis, Calicurgus, 66
  Priocnemioides unifasciatus, 62, *66*

M

Macromerinae, 6
Macromerini, 9, *140* (key), 177
Macromeris, 140
macula, Agenia, 141
maculata, Ceropales, 239, *241*, 244
  Ceropales maculata, 239, *241*
  Evania, 238, 241
maculipennis, Chirodamus, 13, 14, 17, *20* (map)
  Pompilus, 11, 20
magnus, Pompilus (Priocnemis), 55
  Priocnemioides, 50, 51, 52, 53, *55* (map)
major, Minagenia, 227, *229* (map)
manni, Cryptocheilus, 12
marcida, Priophanes, 215
marginata, Pepsis, 27, 28, *30*
marginatus, Calicurgus, 108
marionae, Pseudagenia, 150
mariva, Pseudagenia, 16
maya, Ageniella, 210
mellipes, Auplopus, 144, 145, 146, *151*
  Auplopus mellipes, 144, 145, 146, *152* (map)
  Pompilus, 152
meridianus, Auplopus mellipes, 145, 146, *154* (map)
metallica, Anacyphonyx, 12
  Pseudagenia, 162
metallicus, Auplopus architectus, 146, 147, *162* (map)
mexicana, Ceropales, 263
  Hemipepsis, 33, *38*, 39 (map)
  Mygnimia, 38
  Pepsis, 27, 28, *31*
mexicanus, Auplopus, 145, 146, *156* (map)
  Pompilus (Agenia), 156
michiganensis, Minagenia, 227, 228
Micragenia minima, 226
micropilosus, Pompilus (Agenia), 16
mildei, Pepsis, 26, 28, *29*
mimulus, Priocnemis, 84
Minagenia, *226* (key), 235
  clypeata, 227, *231* (map), 233
  congrua, *227*, 228 (map)
  externa, 226, *232* (map)
  julia, 227, 233, *234* (map)
  lata, 227, *230* (map), 236
  major, 227, *229* (map)
  michiganensis, 227, 228
  minor, 226

Minagenia—Continued
  montisdorsa, 226, 227, 232, *236* (map)
  osoria, 226, 227, *233* (map)
  perfecta, 227, *235*, 236 (map)
  semirufa, 227, 228
  shappirioi, 231, 232
Minageniini, 221, *225*
minima, Ceropales, 244
  Micragenia, 226
minor, Minagenia, 226
minorata, Priocnemis, 6, 7 (fig.), 84
  Priocnemis (Priocnemissus), *84* (map)
Minotocyphus, 221
mintaka, Ageniella, 197
  Ageniella (Ageniella), 190, 191, *197* (map)
minus, Haploneurion, 82
minuscula, Agenia, 101
  Priocnemis (Priocnemis), 90, 91, *101* (map)
minutus, Pompilus, 89
mirabilis, Stenoclavelia, 68
moesta, Priophanes, 84
molestus, Priocnemioides, 58
molinoi, Priocnemis (Calicurgus), 198
mollis, Auplopus, 145, 147, *157* (map)
monachus, Pompilus, 11
Monodontonyx, 9
monticola, Priocnemella, 40
montisdorsa, Minagenia, 226, 227, 232, *236* (map)
montrouzieri, Priocnemis, 82
Moropepsis, 32
Mygnimia, 9
  cressoni, 35, 36
  hesperina, 37
  mexicana, 38
  toussainti, 34
Myrmecosalius, 89
  nigriceps, 89, 103

N

najacra, Pseudagenia, 14
nanella, Pseudagenia, 165
Nannochilus, 226
  obscurus, 226
  osoria, 233
  peruanus, 226
Nannopepsis, 25
navajo, Priocnemis, 89, 104
  Priocnemis (Priocnemis) notha, 90, 91, *104* (map), 106
nebulosus, Priocnemis, 41, 44, 141
  Priocnessus, *41* (map), 46, 49
neglecta, Ageniella, 208
  Ageniella (Ageniella), 190, 191, 198, *207*, 208 (map)
Nemagenia, 168, *174*
neomexicana, Ceropales, 239, 268, *270*, 271 (map)
neotropicalis, Salius, 40
  Salius (Priocnemis), 40
nephele, Pepsis, 28
nigrella, Pseudagenia, 165
nigrellus, Auplopus, 145, 146, 147, 158, 162, 163, *165* (map)
nigricans, Priocnessus, 41 *47* (map), 49
nigriceps, Myrmecosalius, 89, 103
  Priocnemis (Priocnemis), 90, 91, *103* (map)
nigrior, Dipogon (Deuteragenia) sayi, 116, 118, *130* (map)
nigripes, Ceropales, 240, 249, *259*, 260 (map)
nitida, Sphex, 11
norata, Ageniella, 206
  Ageniella (Ageniella), 190, 192, *198*, *206* (map)
notabilis, Ameragenia, 215
notha, Priocnemis (Priocnemis), 90, *104*
  Priocnemis (Priocnemis) notha, 91, 106, *107* (map)
nothus, Pompilus (Priocnemis), 107
Notocyphini, *221*
Notocyphus, 6, 221, *222*
  dorsalis, *222* (key), 224
  dorsalis *arizonicus*, 222, *223* (map), 225
  dorsalis dorsalis, 222, 223, *224*, 225 (map)
  dorsalis *restrictus*, *222*, 225
  plagiatus, 222
  saevissimus, 222
  texanus, 224, 225
novellus, Pompilus, 215, 217
nubifer, Dipogon (Deuteragenia) calipterus, 118, *125* (map).
  Pompilus (Agenia), 125
nuperus, Pompilus, 40
  Pompilus (Priocnemis), 48
  Priocnessus, 41, *48* (map)

O

obscura, Ageniella, 199
  Ageniella (Ageniella), 191, 192, *198*
  Ageniella (Ageniella) obscura, 191, 192, *199* (map)
obscurus, Nanochilus, 226
obtusiventris, Priocnemis, 89
occidentalis, Ceropales fraternus, 244
occidentis, Priocnemis, 105
  Priocnemis (Priocnemis) notha, 91, *105*, 106 (map)
ochreus, Dipogon (Dipogon) brevis, 132, *137* (map)
ochroptera, Hemipepsis, 34, 37
  Hemipepsis ustulata, 33, 34, *37* (map), 65
ochropus, Hemipepsis, 38
Olixon, 6
Onochares, 11
  brazoria, 11, 22
  heiligbrodtii, 11
oregona, Priocnemis, 87
  Priocnemis (Priocnemissus), 84, *87* (map)
orijones, Calicurgus, 108
ornata, Priophanes, 40
osceola, Phanagenia, 141
  Priocnemis, 218

- osoria, Minagenia, 226, 227 *233* (map)
  - Nannochilus, 233
- otiosa, Priophanes, 175, 176

P

- Pachynimia, 32
- *pacifica*, Ceropales, 240, 241, 263, *264*, (map), 266
- paeneparcus, Cryptocheilus, 107
- pallescens, Cryptocheilus, 181
- pallide-fulva, Formica, 215
- pallidicornis, Pompilus (Agenia) dakota, 44, 45
- pallida, Ageniella, 196
  - Ageniella (Ageniella), 190, 192, *195*, 196 (map)
- pallidipenne, Cryptocheilus, 68, 69, *74* (map)
- pallidolimbata, Pepsis, 27, 28, *31*
  - Pepsis pallidolimbata, 27, 28, *31*
- Pallosoma, 32
  - barbara, 32
- *paludis*, Dipogon (Dipogon), 132, *133* (map)
- papago, Deuteragenia, 120
- papago, Dipogon (Deuteragenia) papago, 117, *120* (map)
  - Dipogon (Deuteragenia), 117, 118, *119*
- Paracyphonyx, 9
- parcus, Pompilus, 89
- parkeri, Priocnemis, 176
- partida, Ameragenia, 215
- partita, Ageniella, 193
  - Ageniella (Ageniella), 190, 192, *193* (map)
- parvulus, Calopompilus, 12
  - Priocnemis, 89
- pallidipennis, Priocnemoides, 74
- pattoni, Pepsis, 29
  - Pepsis formosa, 26, 27, *29*
- pedunculata, Stenagenia, 143
- Pepsinae, 6, *8*, 9 (key), 26, 50, 68, 115
- Pepsini, *9*, 10 (key), 12
- Pepsis, 1, 4, 6, 9, 10, *25*, 26 (key), 33, 67
  - angustimarginata, 26, 28, *29*
  - aquila, 27, *30*
  - arizonica, 27, *30*
  - azteca, 26, 28, *29*
  - bequaerti, 31
  - Boguei, 29
  - Bonariensis, 66, 67
  - cerberus, 30
  - chrysothemis, 27, 28, *31*, 32
  - chrysothemis chrysothemis, 27, 28, *32*
  - chrysothemis lucasii, 27, 28, *32*
  - cinnabarina, 32
  - dimidiata, 25
  - dubitata, 30
  - elegans, 26, 27, *29*, 30
  - elegans cerberus, 26, 27, *30*
  - elegans elegans, 26, 27, *30*
  - formosa, 5, 26, 27, 28
  - formosa formosa, 26, 27, *28*
  - formosa pattoni, 26, 27, *29*
- Pepsis—Continued
  - frivaldszkyi, 25
  - gigantea, 25
  - grossa, 25
  - heros, 30
  - hesperiae, 29
  - hirsuta, 30
  - hymenaea, 25
  - inermis, 30
  - limbata, 25
  - Lucasii, 32
  - marginata, 27, 28, *30*
  - mexicana, 27, 28, *31*
  - mildei, 26, 28, *29*
  - nephele, 28
  - pallidolimbata, 27, 28, *31*
  - pallidolimbata pallidolimbata, 27, 28, *31*
  - palliodolimbata smithi, 27, 28, *31*
  - pattoni, 29
  - planifrons, 25
  - pruinosa, 25
  - pseudoformosa, 29
  - ruficornis, 25
  - saphirus, 26, 28, *29*
  - sayi, 31
  - sherillae, 31
  - thisbe, 27, 28, *31*
  - venusta, 27, *30*
- perfecta, Agenia, 235
  - Minagenia, 227, *235*, 236 (map)
- persimilis, Ageniella, 210
- peruanus, Nannochilus, 226
- peruvianus, Cryptocheilus, 67
  - Priocnemioides unifasciatus, 61, *67*
- petiolatus, Pompilus (Agenia), 210
- Phanagenia, 140, *141*
  - bombycina, *141*, 142 (map)
  - osceola, 141
- pictipennis, Priophanes, 177
- pilosa, Deuteragenia, 124
- Pilpomus, 143
- placita, Ageniella (Priophanes), 177, 178, *184*
  - Ageniella (Priophanes) placita, 177, 178, *184* (map)
  - Cryptocheilus, 184, 185
- plagiatus, Notocyphus, 222
- plagosa, Priophanes, 215
- planifrons, Pepsis, 25
- Pogonius, 116
- Pompilidae, 2
- pomilius, Pompilus (Priocnemis), 99
  - Salius, 99
  - Priocnemis, 99
- Pompilus, 2
  - (Agenia) acceptus, 189, 213
  - (Agenia) agilis, 173
  - (Agenia) albopilosus, 14
  - alienatus, 111
  - architectus, 163
  - (Agenia) bombycinus, 141
  - (Agenia) brevis, 131, 135
  - (Agenia) calcaratus, 111
  - (Agenia) calcaratus accolens, 113, 114
  - calipterus, 124
  - (Priocnemis) cincticornis, 40

Pompilus—Continued
- comparatus, 87
- (Agenia) congruus, 227
- (Miscus) conicus, 99
- (Miscus) cornicus, 99
- (Agenia) cupidus, 203
- (Agenia) dakota, 44
- (Agenia) dakota pallidicornis, 44, 45
- dumosus, 67
- fasciatellus, 108
- fascipennis, 111
- femoralis, 89
- femoratus, 143, 144
- flavipes, 81
- formosus, 28
- (Priocnemis) fortis, 11, 15
- (Priocnemis fulgifrons, 173
- (Priocnemis) fulvicornis, 49, 58
- (Priocnemis) germanus, 92
- gravesii, 81
- hyalinatus, 108
- ignipennis, 49, 58
- (Priocnemis) impiger, 108
- (Agenia) iridipennis, 92
- levipes, 226
- (Agenia) longulus, 174, 175
- maculipennis, 11, 20
- (Priocnemis) magnus, 55
- mellipes, 152
- (Agenia) mexicanus, 156
- (Agenia) micropilosus, 16
- minutus, 89
- monachus, 11
- (Priocnemis) nothus, 107
- novellus, 215, 217
- (Agenia) nubifer, 125
- nuperus, 40
- (Priocnemis) nuperus, 48
- parcus, 89
- (Agenia) petiolatus, 210
- (Priocnemis) pomilius, 99
- pulchellus, 108
- (Agenis) pulchrinus, 41
- (Agenia) pulchripennis, 118
- pusillus, 89
- pyrrhomelas, 18
- (Priocnemis) rupex, 113
- (Priocnemis) sartorianus, 177
- (Priocnemis) scitulus, 95
- (Priocnemis) subopacus, 72
- terminatus, 72, 73
- unifasciatus, 62
- (Priocnemis) validus, 11, 24
- (Agenia) varipes, 154
- viaticus, 2
- violaceipes, 198

populator, Dipogon, 131

praestans, Ageniella, 212

pretiosa, Ameragenia, 215
- Priocnemis, 82
- Priocnemis (Sphictostethus), *82* (map)

Priocnemella, 140, 141, *219*
- domingensis, 198
- monticola, 40
- salti, 218
- tabascoensis, *219*, 220 (map)

Priocnemioides, 9, 11, 12, *49*, 50 (key), 68
- *angusticeps*, 51, 58, *60* (map), 64
- *aratus*, 50, *51*, 52 (map)
- austrinus, 50, 51, *53*
- austrinus austrinus, 51, *54* (map)
- austrinus *fuscatus*, 51, *53* (map), 54
- flammipennis, 58, 64
- fulvicornis, 50, 51, 57, *58* (map), 60, 67
- magnus, 50, 51, 52, 53, *55* (map)
- molestus, 58
- texanus, 50, 51, 53, *56*
- texanus *atripennis*, 50, *56* (map), 57
- texanus texanus, 50, *56*, 57 (map)
- tenebrosus, 66
- unifasciatus, 6, 7 (fig.), 51, 58, 60, *61* (key)
- unifasciatus *californicus*, 51, 62, *65* (map), 66
- unifasciatus cressoni, 51, 60, 62, *64* (map), 65, 66
- unifasciatus dumosus, 62, *67*
- unifasciatus luteicornis, 62, *66*
- unifasciatus peruvianus, 61, *67*
- unifasciatus unifasciatus, 51, 61, *62* (map)
- unifasciatus urichi, 62, *66*
- unifasciata ustulata, 65
- urichi, 66

Priocnemis, 9, 10, 11, *80* (key), 81, *89*, 90 (key), 108
- (Priocnemis) *abbreviatus*, 91, *102* (map)
- (Priocnemis) aequalis, 90, 91, *96*, 97 (map)
- agenioides, 186
- alienatus borealis, 110
- (Priocnessus) apache, 46
- (Calicurgus) ariel, 108
- arioles, 176
- arizonica, 179
- (Clistoderes) astarte, 83
- conicus, 84
- coriaceus, 83
- "coriarius," 83
- (Priocnemis) cornica, 90, 91, *99* (map)
- christophei, 108
- directa, 175
- (Calicurgus) doddsi, 108
- dowi, 176
- exaltata, 89
- facetus, 176, 181
- (Priocnemella) fairchildi, 219
- fortella, 14
- (Priocnemis) germana, 90, 91, *92* (map)
- gomelza, 86
- heiligbrodtii, 22
- hesperus, 70
- (Priocnemis) hestia, 90, 91, *97*, 98 (map)
- (Priocnessus) kiowa, 44
- leibyi, 41, 42, 43
- mimulus, 84

Priocnemis—Continued
  minorata, 6, 7 (fig.), 84
  (Priocnemissus) minorata, *84* (map)
  (Priocnemis) minuscula, 90, 91, *101* (map)
  (Calicurgus) molinoi, 198
  montrouzieri, 82
  navajo, 89, 104
  nebulosus, 41, 44, 141
  (Priocnemis) nigriceps, 90, 91, *103* (map)
  (Priocnemissus) nigripes, 84, *86* (map)
  (Priocnemis) notha, 90, *104*
  (Priocnemis) notha *alaskensis*, 91, *106*, 107 (map)
  (Priocnemis) notha navajo, 90, 91, *104* (map), 106
  (Priocnemis) notha notha, 91, 106, *107* (map)
  (Priocnemis) notha occidentis, 91, *105*, 106 (map)
  obtusiventris, 89
  occidentis, 105
  oregona, 87
  (Priocnemissus) oregona, 84, *87* (map)
  osceola, 218
  parkeri, 176
  parvulus, 89
  pompilus, 99
  pretiosa, 82
  (Sphictostethus) pretiosa, *82* (map)
  relicta, 94
  reynoldsi, 171
  rufescens, 180
  (Priocnemis) scitula, 90, 91, *94*
  (Priocnemis) scitula relicta, 90, 91. *94* (map)
  (Priocnemis) scitula scitula, 90, 91, *95* (map)
  semitincta, 168, 170
  subconicus, 41
  texanus, 56
  tinctor, 32
  ursula, 215
  (Priocnemella) wheeleri, 198
  (Priocnemis) zeteki, 215
Priocnemissus, 81, *83*, 84 (key), 89
Priocnemoides, 49
  pallidipennis, 74
Priocnessus, 10, *40* (key)
  apache, 40, *46* (map), 49
  coloradensis, 41, *45* (map), 49
  dakota, 41, *44* (map), 49
  nebulosus, *41* (map), 46, 49
  nigricans, 41, *47* (map), 49
  nuperus, 41, *48* (map)
  prominens, 40
Prionocnemoides, 49
Prionocnemis, 89
Prionocnemus, 89
Priophanes, 168, *176*, 177 (key)
  comes, 177
  eudora, 215
  holonis, 170
  insolens, 215
Priophanes—Continued
  marcida, 215
  moesta, 84
  ornata, 40
  otiosa, 175, 176
  pictipennis, 177
  plagosa, 215
  rufigaster, 177
prominens, Priocnessus, 40
propinquus, Calicurgus, 89
pruinosa, Pepsis, 25
Psammochares, 2
  gracilicornis, 78
  tenuicornis, 78
Psammocharidae, 2, 6, 8 (key), 115, 238
Psammocharinae, 2, 6, 8, 221
Pseudagenia anconis, 215
  antennalis, 159
  apicipennis, 184, 185
  ariella, 159
  birkmanni, 187
  blaisdelli, 212
  (Minagenia) brevicornis, 226
  bruesi, 198
  coerulescens , 160
  erigone, 143
  externa, 226, 232
  feroculis, 23
  floridana, 161
  marionae, 150
  mariva, 16
  mellipes adjusta, 150
  mellipes interior, 152
  metallica, 162
  mexicana flavicoxae, 147
  najacra, 14
  nanella, 165
  nigrella, 165
  submetalica, 205
  tabascoensis, 219
  texana, 213
  virginica, 186
pseudoformosa, Pepsis, 29
pulchellus, Pompilus, 108
pulchrinus, Pompilus (Agenia), 41
pulchripennis, Dipogon (Deuteragenia), 116, 117, *118*, 119 (map), 120
  Pompilus (Agenia), 118
purpuripes, Ageniella, 198
pusillus, Pompilus, 89
pygmaeus, Dipogon (Dipogon), *132* (map)
pyrrhomelas, Chirodamus, 13, 14, 17, *18*, 19 (map)
  Pompilus, 18

Q

quaintancei, Ceropales, 258
  Ceropales elegans, 240, 257, *258*, 259 (map)
quitus, Calicurgus, 108

R

recalvus, Dipogon (Dipogon) brevis, 131, 132, *134* (map), 137
Reedimia, 11
  infernalis, 12

- relicta, Priocnemis, 94
  - Priocnemis (Priocnemis) scitula, 90, 91, *94* (map)
- restricta, Ageniella, 200
- *restrictus*, Notocyphus dorsalis, *222*, 225
- reynoldsi, Ageniella (Leucophrus), 169, *171* (map)
  - Priocnemis, 171
- *rhodomerus*, Ceropales maculata, 139, *243* (map), 245, 247
- Rhopalosomatidae, 6
- robinsonii, Ceropales, 238, *248*, *253*
  - Ceropales robinsonii, 240, *253*, 254 (map), 256
- rosasi, Anacyphonyx, 12
- rubineus, Alasagenia, 193, 194
- rufescens, Ageniella (Priophanes), 178, *180* (map)
- rufescens, Priocnemis, 180
- ruficornis, Pepsis, 25
- rufigaster, Calicurgus, 108
  - Priophanes, 177
- rufigastra, Agenia, 227, 228
- rufipes, Tetraodontoyx, 32
- rufiventris, Ceropales, 238, 253, 255
- rufothorax, Ageniella, 219
- rufula, Ageniella, 219, 220
- *rugata*, Ceropales, 240, 241, 263, *264*, 265 (map), 267
- rugosus, Cryptocheilus, 18
- rupex, Calicurgus hyalinatus, 109, 110, *113*, 114 (map)
  - Pompilus (Priocnemis), 113

S

- saevissimus, Notocyphus, 222
- Salius, 67, 68
  - (Priocnemis) dispertitius, 84
  - fasciipennis, 111
  - fulgidifrons, 173
  - neotropicalis, 40
  - (Priocnemis) neotropicalis, 40
  - pompilius, 99
  - schenckii, 89
  - (Priocnemis) thaumastarius, 81
- salti, Ageniella (Ameragenia), 215, 216, *218* (map)
  - Priocnemella, 218
- saphirus, Pepsis, 26, 28, *29*
- sartorianus, Pompilus (Priocnemis), 177
- saussurei, Hovagenia, 32
- sayi, Dipogon, 128
  - Dipogon (Deuteragenia), 177, 123, *128*
  - Dipogon (Deuteragenia) sayi, 118, *128*, 129 (map)
- sayi, Pepsis, 31
- schenckii, Salius, 89
- scitula, Priocnemis (Priocnemis), 90, 91, *94*
  - Priocnemis (Priocnemis) scitula, 90, 91, *95* (map)
- scitulus, Pompilus (Priocnemis), 95
- Schizagenia, 143
  - carinigena, 143
- *seminole*, Ageniella (Ageniella), 190, 192, *196* (map)
- semirufa, Minagenia, 227, 228
- semitincta, Ageniella (Leucophrus), 169, *170* (map)
  - Priocnemis, 168, 170
- sericea, Dipogon, 123, 127
- sericeus, Dipogon (Deuteragenia), 116, 117 (key), *127*
- severini, Cryptocheilus, 6, 7 (fig.), 69, *76* (map)
- sexpunctata, Sphex, 67
- shappirioi, Minagenia, 231, 232
- sherillae, Pepsis, 31
- similaris, Ameragenia, 215
- Sinotocyphus, 221
- smithi, Pepsis pallidolimbata, 27, 28, *31*
- *sonorensis*, Ageniella (Priophanes) placita, 177, 178, *185* (map)
- Sphecidae, 2
- Sphex annulata, 67
  - carbonarius, 143
  - exaltata, 89
  - fusca, 2, 84
  - hyalinata, 108
  - nitida, 11
  - sexpunctata, 67
  - variegata, 116
- Sphictostethus, 80, *81*, 82
- Stenagenia, 143
  - pedunculata, 143
  - taeneatus, 143
- Stenoclavelia, 68
  - mirabilis, 68
- Stenopepsis, 25
- stigmatica, Ceropales robinsoni, 255
  - Ceropales robinsonii, 240, *255* (map)
- stretchii, Ceropales, 247
  - Ceropales maculata, 139, 245, *247*, 248 (map)
- *striga*, Ageniella (Ameragenia), 215, *216* (map)
- subaequalis, Ageniella, 201
- subconicus, Priocnemis, 41
- subcorticalis, Auplopus caerulescens, 146, 147, *158*, 159 (map)
- submetalica, Pseudagenia, 205
  - Ageniella (Ageniella), 190, 193, 198, 205 (map)
- subopacum, Cryptocheilus terminatum, 69, *72* (map)
- subopacus, Pompilus (Priocnemis), 72
- subra, Ageniella, 186
- superba, Ceropales, 254

T

- tabascoensis, Priocnemella, *219*, 220 (map)
  - Pseudagenia, 219
- taeneatus, Stenagenia, 143
- tenebrosus, Priocnemioidies, 66
- tenella, Ageniella, 94
- tenuicornis, Psammochares, 78
- terminatum, Chryptocheilus, 69, 70, 71
  - Cryptocheilus terminatum, 69, *72*, 73 (map)

terminatus, Pompilus, 72, 73
Tetracryptocheilus, 32
Tetracryptochilus, 32
Tetraodontonyx, 32
  rufipes, 32
texana, Ceropales, 259
  Pseudagenia, 213
texanus, Dipogon, 137
  Dipogon (Dipogon), 131, *137*, 138 (map)
  Notocyphus, 224, 225
  Priocnemioides, 50, 51, 53, *56*
  Priocnemioides texanus, 50, *56*, 57 (map)
  Priocnemis, 56
thaumastarius, Salius (Priocnemis), 81
thione, Ameragenia, 215
thisbe, Pepsis, 27, 28, *31*
thoracicus, Dipogon (Deuteragenia), 116, 118, 123, *126* (map)
tibialis, Ceropales bipunctata, 240, *261* (map)
tinctor, Priocnemis, 32
tolteca, Adirostes, 68
toussainti, Hemipepsis, 33, *34* (map)
  Mygnimia, 34
Trichocurgus, 11
Trichonyx, 32
Trichopepsis, 25
Tumagenia, 143
Tumagenia iris, 143

U

unguicularis, Hemipepsis, 32
unifasciatus, Pompilus, 62
  Priocnemioides, 6, 7, (fig.), 51, 58, 60, *61* (key)
  Priocnemioides unifasciatus, 51, 61, *62* (map)
urichi, Priocnemioides, 66
  Priocnemioides unifasciatus, 62, *66*
ursula, Priocnemis, 215
ustulata, Hemipepsis, 33, *34*
  Hemipepsis ustulata, 33, 34, *35*, 36 (map), 38, 65
  Priocnemioides unifasciata, 65

V

validus, Chirodamus, 13, 14, 17, 23, *24* (map)
  Pompilus (Priocnemis), 11, 24
variegata, Sphex, 116
variegatus, Anoplius, 116
  Dipogon (Deuteragenia), 116, 117, *123*
variitarsata, Agenia, 154
variitarsatus, Auplopus mellipes, 145, 146, 153, *154*, 155 (map)
variolarum, Auplopus, 145, 146, *149* (map)
varipes, Pompilus (Agenia), 154
ventralis, Ageniella (Priophanes) faceta, 177, 178, *183* (map)
venusta, Pepsis, 37, *30*
Vespoidea, 6
viaticus, Pompilus, 2
violaceipes, Pompilus, 198
virginica, Pseudagenia, 186
vogeli, Ageniella (Ageniella), 191, 192, 198, *202* (map)
vulgaris, Calicurgus, 84

W

wheeleri, Priocnemis (Priocnemella), 198

X

Xanthampulex, 237, 238
xanthopus, Agenia, 81
Xenopepsis, 32

Z

zeteki, Priocnemis (Priocnemis), 215

Hosts and Prey

Achillea lanulosa, 248
aestivale, Benzoin, 86
Agelenopsis, 43
  naevia, 43
  pennsylvanica, 43
  sp., 171
Ageniella partita, 268
alba, Melilotus, 54, 59, 76, 224, 258, 259, 260
americana, Bifora, 101, 215
americanus, Ceanothus, 143
Ampelopsis arborea, 54, 59, 263
angustifolia, Sphaeralcea, 172, 260
annus, Helianthus, 258, 270
Aralia spinosa, 247
Araneinae, 113
arborea, Ampelopsis, 54, 59, 263
Arctosa littoralis, 194
arenicola, Pirata, 101
Asclepias pumila, 270
  verticillata, 260
  sp., 57, 66, 194, 224, 225, 260
Aster paniculatus, 263
  sp., 247
aurantius, Paraphidippus, 122
avara, Lycosa, 203, 211
Avicennia sp., 57
avida, Lycosa, 59
Baccharis glutinosa, 215, 224
  salicina, 65, 225
  sp., 57, 71
Benzoin aestivale, 86
Betula papyrifera, 155
Bifora americana, 101, 215
Blueberry, 86

bombycina, Phanagenia, 255
caementarium, Sceliphron, 153
californicus, Ranunculus, 101, 247
Camponotus, 116, 136
  herculeanus, 203
canadensis, Sambucus, 113
carota, Daucus, 37, 101, 247, 272
Carya wood, 122
Cassia nictitans, 171, 183, 215, 266
Ceanothus americanus, 143
Cercidium microphyllum, 37
Ceropales hatoda, 194
Chrysis pattoni, 153
Circuta maculata, 54, 255
Cirsium lanceolatum, 247
Cleome serrulata, 20, 71
Clubiona sp., 219
Condalia lycioides, 65
Conium maculatum, 76
Corn, 180
Daucus carota, 37, 101, 247, 272
drummondii, Sapindus, 65
Eriogonum sp., 247, 248, 258, 260
Eupatorium perfoliatum, 155
Euphorbia marginata, 59, 61, 63, 64, 204, 215, 263
Evarcha hoyi, 101
Fagus grandifolia, 122
gallica, Tamarix, 65, 77, 258, 260
glutinosa, Baccharis, 215, 224
Gnaphosa sericata, 194
grandifolia, Fagus, 122
Guardiola tulocarpa, 225
hatoda, Ceropales, 194
Helianthus anuus, 258, 270
herculeanus, Camponotus, 203
honeydew, 45, 49, 155, 174, 180, 203, 208, 247, 268
hoyi, Evarcha, 101
"kochii, Lycosa," 143
lanceolatum, Cirsium, 247
lanulosa, Achillea, 248
lapathifolium, Polygonum, 59
Liriodendron sp., 45, 49, 203, 268
littoralis, Arctosa, 194
Lomatium sp., 83, 247
lycioides, Condalia, 65
Lycosa avara, 203, 211
  avida, 59
  "kochii," 143
  riparia, 63
  sp., 76, 83, 101, 211
maculata, Circuta, 54, 255
maculatum, Conium, 76
Maevia vittata, 143
marginata, Euphorbia, 59, 61, 63, 64, 204, 215, 263
marginatus, Paraphidippus, 106
mealybugs, 180
Medicago sativa, 247
Melilotus alba, 54, 59, 76, 224, 258, 259, 260
microphyllum, Cercidium, 37
Monarda punctata, 59
  sp., 77, 80
naevia, Agelenopsis, 43
nervosus, Zygoballus, 100
nictitans, Cassia, 171, 183, 215, 266
nuttallii, Polytaenia, 37, 59, 65, 263, 272
paniculatus, Aster, 263
papyrifera, Betula, 155
Paraphidippus aurantius, 122
  marginatus, 106
Pardosa sp., 101
partita, Ageniella, 268
Pastinaca sativa, 97, 113, 136, 247
pattoni, Chrysis, 153
pennsylvanica, Agelenopsis, 43
perfoliatum, Eupatorium, 155
Petalostemum sp., 57
Phanagenia bombycina, 255
Phidippus sp., 137, 153
Pinus strobus, 155
Pirata arenicola, 101
Pisaurina undata, 153
Pogonomyrmex sp., 215
Polistes sp., 153
politum, Trypoxylon, 153
Polygonum lapathifolium, 59
  sp., 247
Polytaenia nuttallii, 37, 59, 65, 263, 272
Prunus serotina, 86
Pseudotsuga taxifolia, 163
pulchella, Vicia, 143
pumila, Asclepias, 270
punctata, Monarda, 59
Ranunculus californicus, 101, 247
riparia, Lycosa, 63
salicina, Baccharis, 65, 225
Salix sp., 208
Sambucus canadensis, 113
Sapindus drummondii, 65
sativa, Medicago, 247
  Pastinaca, 97, 113, 136, 247
Sceliphron caementarium, 153
sericata, Gnaphosa, 194
serotina, Prunus, 86
serrulata, Cleome, 20, 71
Solidago sp., 54, 59, 63, 225, 243, 247, 263, 270, 272
Sorghum, 180
Sphaeralcea angustifolia, 172, 260
spinosa, Aralia, 247
Stillingia sylvatica, 80, 263
strobus, Pinus, 155
sylvatica, Stillingia, 80, 263
Symphoricarpos sp. 54
Tamarix gallica, 65, 77, 258, 260
taxifolia, Pseudotsuga, 163
Trypoxylon politum, 153
tulocarpa, Guardiola, 225
undata, Pisaurina, 153
Vicia pulchella, 143
verticillata, Asclepias, 260
vittata, Maevia, 143
Zelotus sp., 194
Zygoballus nervosus, 100

U. S. GOVERNMENT PRINTING OFFICE: 1956

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01421 2963